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MAGAZINE

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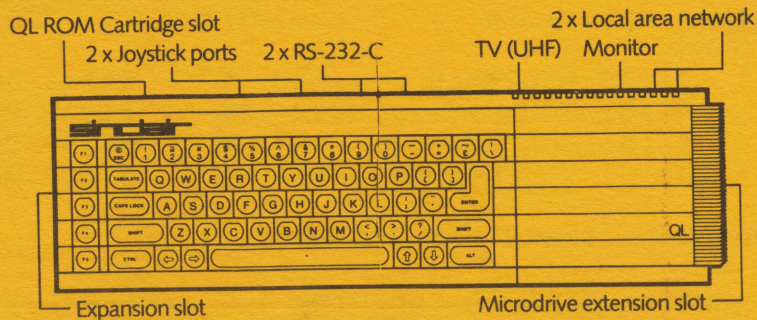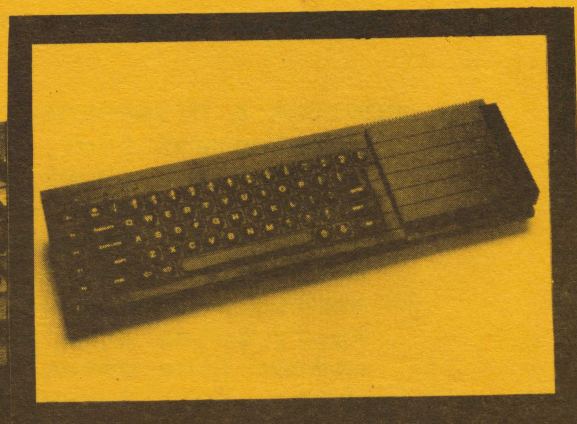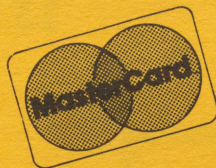
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Editor's Corner

Do you still like to make and keep New Year's Resolutions? I do, and first on my list was to re-design that old TIME DESIGNS logo. Well, I had it done in time for this issue. I feel it is a big improvement to the over-all appearance of the magazine, and a trade mark to be associated with. What do you think?

A few of our advertisers mentioned to me that some of you took advantage of the new pricing, and adopted a Sinclair QL into your home (or business). Good news for you. Starting with this issue, TIME DESIGNS will feature on a regular basis, articles and information for the QL. At one time I had been contemplating a separate publication for the QL, but presently I feel this would be premature. The market is rather small right now and I think our readers would be much better served with an over-all Sinclair publication (we are a close knit bunch who understand each other). I have lined up a couple of QL writers who will be bringing us some neat features. By the way, if you haven't heard, Sinclair is discontinuing their QLUB service to American owners. Instead, they have opted to support other QL-related publications (like TIME DESIGNS).

Another QL publication that you may have received free in the mail recently, is the QL REPORT, published by Curry Computer (PO Box 5607 Glendale, AZ 85312). Rob Curry has announced that early this year they will offer the QL REPORT on a subscription basis. I feel that their newsletter would be worth subscribing to, as they have been "pioneers" in the U.S. QL market...stocking products while we were all still skeptical of seeing the QL's arrival here.

If all of this QL talk has brought a lump to the throat of you T/S users (who have no use for this machine), you have nothing to worry about. By no means will TIME DESIGNS short you of information for your computer. You are the main reason for this magazine. This issue has more T/S stuff than ever before, and even additional pages.

Although I have a QL here in the office (for testing purposes), my 2068 with disc drives practically runs this business.

I have a "special offer" for ZX81/TS 1000 users only. I have been wanting to devote an entire page to special tips and also short programs/routines that you might like to share with other users. I will print as many as possible. Would you like to see your info and name in print? Any "takers" on my offer? I hope so, as a column like this is really needed.
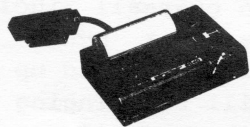
Well, it has been two years now since most of us were orphaned by the Timex Computer Corporation. Have you realized that the support for your computer has not deminished, but has for all practical reasons, improved? Quite an amazing story. One of the big "slicks" should do a feature story on our thriving T/S community.

Thank you Sinclair for still supporting us. Although sometimes we haven't understood you, we are very glad that your still hanging in their.

To all Spectrum (16k, 48k, Plus and 128k), QL, 2068, ZX81, TS 1000/1500, and ZX80 users...keep up the good work!

contents

LETTERS

Direct all correspondence to: The Editor c/o Time Designs
29722 Hult Rd., Colton, OR 97017

"Your readers may be interested in knowing about the availability of a relatively inexpensive full size [dot-matrix] printer. A recent catalog from: DAK INDUSTRIES, INC., 8200 Remmet Ave., Canoga Park, CA 91394, contained an ad for the GORILLA/BANANA printer for the relatively low cost of $89.90 plus $8.00 for P&H. Admittedly, this printer has certain limitations. It does not provide true descenders for letters with tails, but text is still very readable. In my opinion, to obtain a full 80 col. dot-matrix printer for less than twice the price of the 2040 thermal printer is well worth that error in the letter format...ads for TASPRINT claim it will provide true descenders with this printer. The ad [for the printer] did claim it was a close out, and quantities were limited so they may be all gone by now. Compatability with the Centronics I/F and TASWORD II is demonstrated by the fact that this letter was written using them and printed on my GORILLA/BANANA printer."

Vance J Carpenter
Fairport, NY

EDITOR: RMG ENTERPRISES,1419 1/2 7th St., Oregon City, OR 97045, has an EPROM that replaces the one in the GORILLA/ BANANA, and gives you descenders. Price is $14.95.

"I'd really appreciate help from TIME DESIGNS or any of its many subscribers on the following T/S 1000 and T/S 2068 problems. 1000: How do you reconcile the ORGANIZER (16k) software program with a 64k RAM hardware add-on? Without upgrading the software to 64k, the 64k hardware is useless!!! 2068: How do you get the VU-FILE software program to print graphics output? VU-FILE is the software equivalent of ORGANIZER. Graphical output (white characters on black background) on the T/S 1000 by ORGANIZER is straightforward, requiring only use of the graphics key. The same is not true, however, for VU-FILE print-outs by the 2068!!! VU-FILE refuses to print-out white characters on black background."

Ed Wheeler
534 Line Road
Hazlet, NJ 07730

EDITOR: Those VU-FILE programs (developed by PSION of the U.K.) do have their limitations. Many users prefer other data bases that are more flexible like PRO/File (which has many modification possibilities). However, there is a book available, VU CALC/VU FILE (and the ORGANIZER) by Robert Masters. 165 pages cover these programs in-depth, and may have info that you are looking for. One dealer that I know has it in stock is SUNSET ELECTRONICS, 2254 Taraval St. San Francisco, CA 94116. Price is $9.95 plus $3.00 for total order S&H. If any readers have a specific patch for these programs, please forward it to Ed.

2

"I am looking for a simple Bubble Sort program for the Timex. I have seen programs for other computers in various magazines. I own a T/S 1000 with a 16k RAM pack."

Tony Bates
Jackson, WY

EDITOR: I "dug-up" a short BASIC Bubble Sort algorithm, that you might be able to use. Lines 130 and 140 are not necessary, but allow the user to view the random numbers before they are sorted. Also, my printer's zeros don't have the usual slash, and watch out for "I" and 1 (the numeral).

```
30 REM BUBBLE SORT ALGORITHM
40 RAND
50 DIM A(20)
60 FOR I = 1 TO 20
70 LET A(I) =INT (RND * 100+1)
80 PRINT A(I)
90 NEXT I
130 PAUSE 200
140 CLS
150 LET N = 19
160 LET SL = 0
170 FOR I = 1 TO N
180 IF A(I) <= A(I+1) THEN GOTO 240
190 LET AA=A(I)
200 LET A(I) = A(I+1)
210 LET A(I+1) = AA
220 LET SL = 1
230 LET N = 1
240 NEXT I
250 IF SL = 1 THEN GOTO 160
260 REM COMPLETED SORT
300 FOR I = 1 TO 20
310 PRINT A(I)
320 NEXT I
```

"...I own a TS2068 (with ROMSWITCH) and am starting to get a collection of Adventure programs. This brings me to the point of this letter. Have you ever considered including an "adventurer's column" in your mag? I have reached a dead end in some of the adventures that I have, and on some of them I have gotten a bunch of clues. For example, I have completely mapped out Part 1 of the BACK-PACKER'S GUIDE TO THE UNIVERSE, and have found the keys for all but one lock. But I can't get past the first set of rooms in the MOUNTAINS OF KET. I hope that you will consider my proposal and try to find someone to write an article for you. I am sure that others would send in tips as they found them out, and also ask for help when they got stuck. Thanks for a great mag."

Douglas Jeffery
Telkwa, B.C.
Canada

EDITOR: An article or column such as you have suggested has been on the "back-burner" for awhile. I think just about everyone has at least one computer game in their software collection no matter what their computing interests are. (I am still stuck in the early part of THE HOBBIT!) Look for game tips in a future issue, as I have someone in mind for the project.

"Since in my letter [see TDM Nov/Dec '85 issue] I indicated that MC for SOUND was easy, I thought I had better include the following:

```
00030 SOUND   POP   HL
00035         LD    A,(HL)
00040         CP    14
00045         JP    C,SND
00050         JP    (HL)
00055 SND     PUSH  HL
00060         LD    C,245
00065         OUT   (C),A
00070         INC   HL
00075         INC   C
00080         LD    A,(HL)
00085         OUT   (C),A
00090         POP   HL
00095         INC   HL
00100         INC   HL
00105         PUSH  HL
00110         JR    SOUND
```

To illustrate its use, the following is the MC equivalent of line 10 in the GUNSHOTS listing on page 195 of the USER MANUAL. The last byte, in this case 201, is really the first byte of the rest of the program. This byte is required by the SOUND sub-routine to be >=14.

```
00200 SHOT    CALL SOUND
00205         DEFB 6,15,7,7,8,16,9,16
00210         DEFB 10,16,12,15,13,0,201
```

Ron Ruegg
Baton Rouge, LA

"As I was skimming through the Sept/Oct '85 edition of TIME DESIGNS, I was "shocked" to see a joystick application program which used the exact same algorithm as mine. My first thought was; How dare Mr. Fricke (the author), use his name on my software. Then I reflected. How could Mr. Fricke have gotten a hold of my ingenious software in the first place? I hadn't even published it yet. Logic prevailed and I concluded that both Mr. Fricke and I had independently devised an identical algorithm for the same purpose; That of BASIC joystick control for the T/S 2068 computer.
  ...My next step was to verify if both algorithms were indeed identical. I dug deep into my vast library of 2068 programs, and low and behold, there it was; written almost two years prior with no witness to the event other than my own personal documentation. Only the variables were different. Where I used x and y as coordinates, Mr. Fricke used the more meaningful variables c and l, for column and line.
  I had always intended on submitting my joystick program for publication but so far it had been easier to find an excuse not to. Although I realized this simple program could benefit the T/S 2068 community at large, I did nothing to encourage this fact. The bottom line being "I am a procrastinator" ("I'll do it later").
  You can imagine my suprise then, when I saw "my" program credited to someone else's name. My first reaction was one of disbelief and surprise, followed by anger (at myself), next of jealousy and finally redemption. The next instant, I found myself vowing...which brings me to the "here and now" and "what are you going to do about it (?)".
 First, I would like to commend Mr. Warren Fricke of Depew, NY, for his initiative in submitting an ingeniously efficient, yet simple algorithm for BASIC joystick control for the 2068. Commendations are also forthcoming to Mr. John McMichael of Bozeman, Montana for having inspired Mr. Fricke in the first place with his MC joystick program published in TDM (May/June '85). Credit also goes to editor Mr. Tim Woods, being first to publish these algorithms in his leading journal TIME DESIGNS Magazine.
  Second, to all you prospective programmers: send in your ideas and programs. There are at least a half dozen leading American T/S periodicals, waiting and wanting for your INPUT. You have nothing to lose and so much to gain and so do we. You may even get royalties for your work if its up to standards. Do as I say, not as I do.
  Thirdly, having said all that and still feeling like a "shmuck", I set out to redeem myself..elsewhere in this magazine you will find MY program on BASIC 2068 joystick control. It is an enhancement to a program with which you are already familiar (if you have read this far), and has been reproduced in full for clarity of description. I call it JOYSTICK WRAP AROUND. I trust good use will be made of it."

Martin DeBoniface
Winnipeg, Manitoba
Canada

EDITOR: Thank you Mr. DeBoniface for your story with a moral, and a "happy ending".
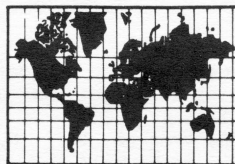
128K AND ENIGMA

Reported by R. Lussier

The 128k Spectrum (code name "Derby") has been launched in Spain, and will be available in the Spring in Britain.

Essentially two computers in one: when turned on, the 128k mode is on automatically but type "SPECTRUM", and it becomes a 48k Spectrum Plus, completely compatible with all the existing Spectrum software. The UK model will sell for about ¢150.

The 128k looks like a Spectrum Plus with a big heat sink bolted on the right-hand side, and a separate [numerical] keypad attached by a coil-cord into the front of the Spectrum. A full range of ports have been included: an RS232 socket, MIDI sockets for musical instrument hook-up, RGB/composite socket and TV socket. The tape leads are on the left-hand side, and the edge connector is in the usual place. There is a SOUND chip as on the 2068 (but SOUND is thru the TV speaker and adjustable.

In the 128k mode, the keyword system is not used. They are entered one letter at a time, but keywords are retained in the 48k mode. The 128 has the capacity to act as a RAM disk system. This is a facility where areas of RAM can be set aside to store a suite of programs or sets of data, in much the same way as on the Microdrives. Access to files on RAM disk is almost as instantaneous. As an example, the command "CAT", produces an instant catalog of RAM files. There is still no sign of a joystick port.

There may be a few changes before it appears on the British market scene. It looks to be a strong base model for the new Sinclair range of models including the new portable PANDORA and the desktop ENIGMA. It is stated in the current catalog of the EMC (15 Kilburn Ct., Newport, RI 02840) that they will be carrying this great new product [Editor's Note: reportedly the English Micro Connection now has the Spanish version of the Spectrum 128k available now for $259.95 plus $10 P&H. The keyboard, screen text and users manual is in Spanish]. If interested, then contact them for more information.

The ENIGMA will be Sinclair's first "Mega-machiche". Sinclair believes that one Megabyte RAM is a minimum needed to compete with Atari's ST and the Commodore AMIGA. The ENIGMA will also have two 3.5 inch disk drives. It is planned for launch in May 1986 between ¢500 to ¢1000 price range. The programs QUILL, ABACUS, ARCHIVE and EASEL will be on ROM. It will also have full window, icon and mouse environment, as well as GEM (used on the APRICOT computer). The Enigma will be sold as a complete package. This will include software, drives, mouse, color monitor and printer. It may also develop the addition of phone and communications work station.

AN AMERICAN ORIGINAL

Most colorful and popular arcade-type game programs are instantly associated with the British Spectrum. Until now that is. An American programmer, John Coffey of Scottsburg, Indiana, has developed a brand new arcade game called "DIAMOND MIKE", for the un-modified 2068. This is the first program of its genre, written in 100% machine code, that has been released here especially for the 2068, in the last two years. Due to the author's thoughtful placement of code in memory, Diamond Mike also runs on the Sinclair Spectrum (or 2068 with Emulator). Mr. Coffey is the owner of a software company called JRC SOFTWARE. He has also written the 2068 COMPASS assembler/compiler package, the T/S 1000 SUPERTAPE, and 2068 GREAT GAMES and GRAPHICS SHOW.

DIAMOND MIKE (as the name suggests) is a cute little character who craves diamonds. He impatiently stamps his foot, waiting for you to guide him thru the diamond mine. All along the way are boulder-sized obstacles that could have "deadly" results. There are also attacking amebas and butterflys (?) to watch out for. The game has a lot of personality, and is addictive.

On the same tape is a bonus program called CAVERN. It is a space game imported from Canada. There is also an "electronic" catalog, that describes other programs being offered by JRC Software. An impressive (and unique) feature of Diamond Mike, is the users ability to SAVE a short demo version of the game to pass along to a friend. Over all there are 22 different screens/puzzles,

and six levels. At its $17.95 price, JRC Software (PO Box 448, Scottsburg, IN 47170) will be selling lots of DIAMOND MIKE copies this year.

QUICKEY 2068

QUICKEY 2068 is a series of keyboard overlays that assist the user in remembering important commands for selected popular programs like TASWORD II and MSCRIPT. The overlays are made of durable plastic and have the commands printed on the top-most section (above the keyboard), so the user does not have to glance down at the keyboard itself.

The Tasword version of Quickey 2068 includes commands for TASPRINT. Other overlays will be available soon, for programs like OMNI-CALC, ect. There is also a blank model available that the user can customize to suit any need.

AN-TO PRODUCTIONS (9009 West Elm St. #2 Phoenix, AZ 85037) is the developer and distributor of the Quickey 2068. Prices for the Tasword and MSCRIPT versions are $3.99 each plus 50¢ for postage. Blank overlays are $3.00 each. Any two versions can be ordered for $7.50 plus 50¢ for postage.
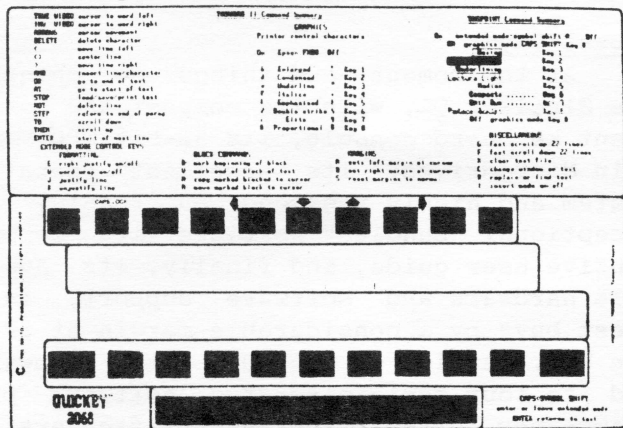
PRODUCT NEWS

The OLIGER 2068 FLOPPY DISC INTERFACE is available now. The interface consists of two boards that plug into the OLIGER 2068 EXPANSION BOARD. Disc Board "B" contains JLO SAFE, the disc Basic eprom. At a later date, an advanced DOS written by Ray Kingsley of SINWARE, will be available. Package price for both "A" and "B" boards: $97.95 for kit, and $119.95 assembled/tested. The required Expansion Board is $43.95 for kit version, and $54.95 assembled/tested. For further information write to The John Oliger Co. at 11601 Whidbey Dr., Cumberland, IN 46229.

LARKEN ELECTRONICS, RR#2 Navan, Ont., Canada K4B 1H9, has a disk drive controller board for the 2068 that is Spectrum Emulator compatible. Single drive version is priced at $95.00 (U.S.) plus $6.00 postage. A modification for second drive will be available by February 1986.

Two issues of EXTENSIONS are available to upgrade PRO/FILE 2068 with a third soon to be released. A total of two dozen enhancements, improvements, and corrections are provided, including automatic updating of files and a data save. The upcoming third issue, when combined with the first two, will make profile Spectrum/Emulator compatible. Extensions are $6 each from Robert C. Fischer, 221 Scoggins St., Summerville, GA 30747.

Uncased new T/S 2050 MODEM CARDS are available from GLEN D. CLIFFORD, 13910 Halldale Ave., Gardena, CA 90249, for $25 each. The circuit cards are reported to be 100% operational and include the interface connector and phone line cord. The user must supply a 9 volt power supply, modem software (such as the readily available MTERM), and an optional case. There is a 10 day exchange privilege.

SIMULUSION, Box 2382, La Jolla, Calif., 92038, is closing out all of their software packages for the ZX81 and T/S 1000. Titles like CLASSIC GAMES and BANNER/MESSAGE BOARD, come "bubble-packed" and complete with instructions. Prices start at 99¢! A catalog is available upon request. SIMULUSION now has a list of entertainment software for the Sinclair QL. Write for further information.

Many new products for Timex/Sinclair micros will be unveiled this year by ZEBRA SYSTEMS INC., 78-06 Jamaica Ave, Woodhaven, NY 11421. TECH-DRAW JR. is their first new release this year. Tech-Draw Jr. is similar to the original TECH-DRAW, except this version uses a standard joystick instead of a graphics tablet to control the software's functions. It supports most popular printers and interfaces. Price is $19.95 for cassette and $24.95 for Zebra 3" diskette. Add $3.00 for postage (total order). During the first quarter of 1986, Zebra Systems will enhance their popular 2068 Disk Drive System with optional Spectrum software compatibility and a CP/M compatible operating system. Their inexpensive SPECTRUM EMULATOR CARTRIDGE will be available in an enhanced version with "pull-up" resistor pack for $29.95. During the month of January, Zebra is having an inventory clearance sale. Example: T/S 1000 and 2068 versions of ZEBRA TALKER (a voice synthesizer), normally priced at $69.95...

is $35.00 during the sale.

PERIPHERALS DIRECT LTD., PO Box 3301, Northbrook, IL 60065, has the heavy-duty AMDEK DXY100 X,Y PLOTTER for $125.00 plus $10 for postage. The Amdek Plotter is the "flat-bed" type, 360mm x 260mm plotting surface, and includes a Centronics port. Great for 2068 graphics.

Jack Dohany, 325 O'Connor St., Menlo Park, CA 94025, has an interesting concept for selling his software. "For each program you may pay me what you feel is fair...I suggest a nominal $5.00 per program, and less for upgrades." For a list of Jack's programs and enhancements of some popular software, send a legal SASE.

HAM RADIO

The TIMEX/SINCLAIR AMATEUR RADIO USERS GROUP (TSARUG) has organized a FIDO NETWORK node to serve the members of the organization and others who are interested. Messages can be sent to network 15 node 1006. The bulletin board can be accessed directly at (505) 646-5194. Files that are available include early copies of articles to appear in QZX, the groups newsletter. For more information, send SASE to Alex F. Burr K5XY, 2025 O'Donnell, Las Cruces, NM 88001.

COME TO THE FAIR

Plans are being finalized for the MID-WEST TIMEX/SINCLAIR COMPUTERFEST to be held in Cincinnati, Ohio on May 3 and 4, 1986. On hand will be vendors, services, and users groups. Also planned are classes and lectures by guest speakers, hardware and software demonstrations, and a "swap-shop". A major goal for the T/S COMPUTERFEST is to introduce the wide scope of products and services available for the discontinued T/S line of computers, and perhaps new practical uses for these computers. For further information, contact Jack Roberts of the T/S Connection, 3832 Watterson Ave, Cincinnati, OH 45227, or Frank Davis, 513 East Main St, Peru, IN 46970 (Compuserve I.D. #75525,1324) Make plans now to attend!

"WHY THE QL?"

### REASONS WHY YOU SHOULD TAKE THE QUANTUM LEAP

by Mike de Sosa

Why should you consider the purchase of a SINCLAIR QL? Why, possessed of an excellent and only recently fulfilled system such as the Timex/Sinclair 2068, should you go to all the trouble and expense of switching systems--just think of the problem in transcribing your current files to Microdrive format? And why purchase a system that Sinclair Research doesn't seem proud enough of to advertise, and which some have said is Uncle Clive's first computer failure? Why opt for the QL instead of your current system, another reasonably priced wunderkind computer such as the new Atari, Commodore, or Amstrad, or, perhaps, a somewhat more expensive IBM PC-compatible? Finally, why consider a system which reviewers have generally panned? There are many excellent and indisputable reasons why you should consider such a purchase. Here are a few. There are many others.

A Best Buy!

At the moment--and things do change--the Sinclair QL, with its compact and efficient keyboard console, its 32-bit CPU, its twin Microdrives, its excellent operating system and highly regarded SuperBASIC, its exceptional "bundled" software, its comprehensive user guide, and finally, its available hardware and software support, is a "best buy" by a considerable margin at $299. The U.S. version of the QL, its firmware, and its four semi-integrated software programs--now in their fourth or fifth version, comprise a mature and thoroughly debugged system for which dozens (who really needs thousands?) of excellent software programs and numerous state-of-the-art expansion and mass-storage systems are now available.

The QL Keyboard Console

The 3-pound keyboard console--a triumph of design and engineering, recognized as such by the Museum of Modern Art--includes all QL components except a separate one-pound power supply. QL components include two CPU's, the 32-bit Motorola 68008 (cousin to that in the Apple Macintosh) and the 8-bit Intel 8049; four additional Sinclair-designed ICs; a full-sized, 65-key QWERTY keyboard, first-class in most respects but with no numeric keypad; twin, built-in Micro drives; expansion ports for extra RAM, disk

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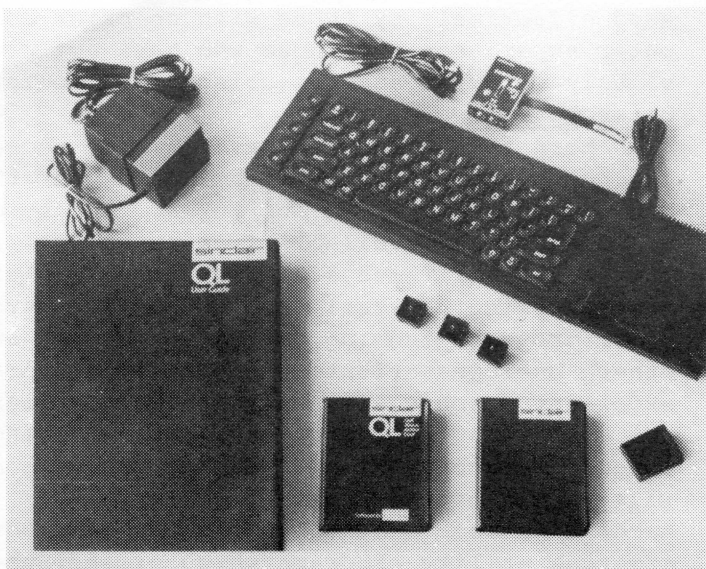
This is what you get for $299.   photo by Mike de Sosa

drives, Microdrives, and peripherals; a ROM-cartridge port; two complementary joystick ports; two RS-232C serial interface ports, one optimized for output, one for input; an RGB monitor output providing 512 by 256-pixel definition in four colors; a TV output providing 256 by 256-pixel definition in eight colors; and two local-area-network ports by which up to 64 QLs may be connected in series to function interactively. All in all, the QL is remarkably compact, light, versatile, and powerful--it is the first lightweight, low-cost super-microcomputer, about which more later.

The QL ROM

The QL's 48K ROM, expandable to 64K with a ROM Cartridge, consists of the QDOS (the QL operating system) and SuperBASIC, a major advance in computer languages. The QDOS is classified as "single-user, multi-tasking, time-sliced system" with "device-independent input and output." What is all of this gobbledygook in simpler terms? The QDOS, by assigning time to two or more pro-grams in separate, minute increments of ms. (microseconds), can run several programs simultaneously (or what seems like simul-taneously). The source of program input or destination of program output may be spec-ified when the program is run, obviating the need for duplication of effort in, for ex-ample, writing a program to send data alter-natively to a monitor, printer, modem, or another networked QL. The QDOS also provides for multiple, and independently functioning "windows" on your monitor screen, with each displaying the data for a particular pro-gram.

The QL RAM

The QL offers a respectable, if not overly generous 128K of RAM, expandable in 64K, 128K, 256K, or 512K increments to a maximum 640K. (The QL video circuits require 32K of RAM, leaving 96K of RAM available for program and data; QL software programs may occupy upwards of 80K.) Two British firms are now replacing the two 64K RAM chips of the QL with two 256K chips, creating a Super QL with 512K RAM internally (the cost, $225 to $275). More than one million separate addresses (line numbers) are available in any QL RAM option.

QL SuperBASIC

A major inovation which some have sug-gested is the profound contribution of the QL system is Sinclair's high-level, arti-ficial language, SuperBASIC. More than an expanded Timex/Sinclair 2068 BASIC, Super-BASIC offers much greater flexibility than previous versions. User-defined procedures and functions--callable by name without ref-erence to line numbers--may be used to ex-tend an already much-enlarged SuperBASIC vocabulary. Data is more readily transferred between variable types, with string vari-ables accepting numeric data and vice versa. Repetition, branching, decision-making, and other logical and array-handling procedures are improved. And the very mechanics of pro-gramming itself are automated. (Some, like the writer, will miss the "smart cursor" and single-keystroke aspects of previous Sin-clair BASICs, but this sacrifice is accept-able considering the improvements.)

The QL Microdrives

Two built-in Microdrives are at one time the Achilles' Heel of the QL and the key to its success. Much criticized at first but now relatively trouble-free, the tape drives operate superbly together to provide all the file flexibility and bulk storage you may ever need. Later versions provide, on average, about 115K of data storage (that is about 20,000 words) per Microdrive cart-ridge. Up to six external Microdrives may be connected, but the trend seems to be toward adding disk drives which operate in con-junction with the Microdrives. The four QL "bundled" software programs each load in less than twenty seconds.

After much deliberation, I have decided to forego disk-drives and expand my QL's RAM, externally, to 512K. (External RAM cards are transferrable to other QLs and now operate a little faster than built-in RAM modifications.) I may get one "external" Microdrive to better facilitate file backup and database operations. External QL Micro-drives are not yet available.

QL "Bundled" Software

The four software programs that come

packaged with the QL at no extra cost are all first-class--two of them are genuinely superb (QL Archive, a database program, and QL Easel, a business graphics program). QL Quill, a "what you see is what you get" word processor, is very easy to use with only minor flaws that will, no doubt, be corrected in later versions. QL Abacus is a spreadsheet program, limited only by the maximum size of its grid and the absence of built-in statistical functions.

QL Archive is a "smart" filing system, programmable in its own command language, that is open-ended in it's capabilities, limited in scope only by RAM available. More books and articles have been written regarding the applications and use of Archive than about any other QL software program, and this will continue to be the case. Not as easy to use as the other QL software programs, Archive is capable of automatically extracting desired data from several different files, manipulating and ordering it in complicated ways, and producing finished screen or hard-copy reports in any format desired.

QL Easel is the reviewers' favorite QL software program. It has been suggested that every organization with a need to produce 35mm color graphics should own a QL, if only for that purpose. Simple to use, QL Easel produces graphics suitable for business, governmental, academic, or private use in eight basic formats, each one of which can be tailored to your preference in almost every way. Backgrounds, bars and lines of every sort, pie-chart segments, and annotations may be selected from many choices offered, or designed from scratch.

The programs are semi-integrated in their present version. To be _fully_ integrated, all programs would have to be loaded in RAM at one time--occupying about 300K of RAM without their data files. But this too may change in later versions designed for use with QLs with much larger RAMs. All QL software programs--are comprehensively self-documented in on-line HELP facilities which take you directly to the information needed and return you precisely to the same spot in the program from which you called for help.

The QL is User-Friendly

The QL's 32-bit CPU is designed to run several complex programs rapidly, but a spinoff of this chip architecture, perhaps more important in the long run, is that programs can be designed to be very simple in operation. And that is what has been done in the case of the QL and its bundled software. The QL and its software are designed to be used effectively by those with no prior computer experience and those who have not previously met with success using a computer.

Other QL Software

More than a hundred serious and recreational programs are now available in the U.K., with emphasis on the former. Most of these should be available from suppliers in the U.S. soon. Those available now include the following: several full-accounting systems; project-planning, decision-making, and other business-oriented programs; several excellent graphic arts programs; compilers for more than a dozen other programming-languages, including a revolutionary compiler for converting a SuperBASIC program to machine code; many educational programs; numerous utility programs which expand Super BASIC and facilitate routine operations, one in a manner that apes the Apple Macintosh; all sorts of games including excellent road-racing, bridge, and backgammon simulations, and two you-must-see-to-believe tennis and chess simulations from Psion Limited (producers of the QL software programs), the
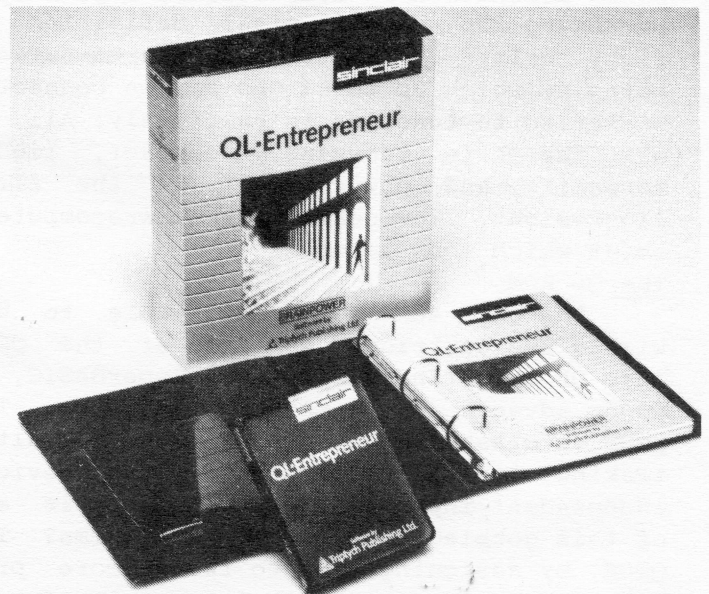

photo by Sinclair

latter the '84 Microcomputer Chess Champion; and other programs of every sort.

Third-party Hardware for the QL

Numerous state-of-the-art disk and expansion systems have been designed for the QL, including CP/M systems if that is your bag. The best of these will be marketed here --all at prices generally much less than those for other comparable systems.

The Future of the QL

Although the folks at Sinclair Research USA won't tell, I believe that the QL in its present form will be a relatively long-lived computer perennial. There is some talk of a QL modification with expanded RAM, and a

built in 3 1/2-inch disk drive, perhaps with the four QL software programs integrated as part of ROM. But this may not happen, or happen soon. Besides, if you purchase a QL now only to be confronted with a superior version later, you can always network your old QL with your new one.

European users of the QL had to wait many months for the bugs to be exterminated from the QL ROM, the Microdrives, and the QL software programs, and for compatible peripherals and software to appear. And the price of the QL was higher then. We now have a mature system with lots of backup offered to us at a bargain price.

I don't know whether the Sinclair QL will be a market success in this country. I only know that the QL as the first light-weight, low-cost supermicrocomputer--a technological and historic watershed that may foreshadow revolutionary changes in most aspects of the computer world--deserves to be a success. Any questions?

Next time--programming in SuperBASIC on the Sinclair QL.

MIKE DE SOSA is a retired Air Force officer, with a Ph.D. from the University of Oregon, who has completed a comprehensive book on the QL and its software, and is now looking for a publisher.
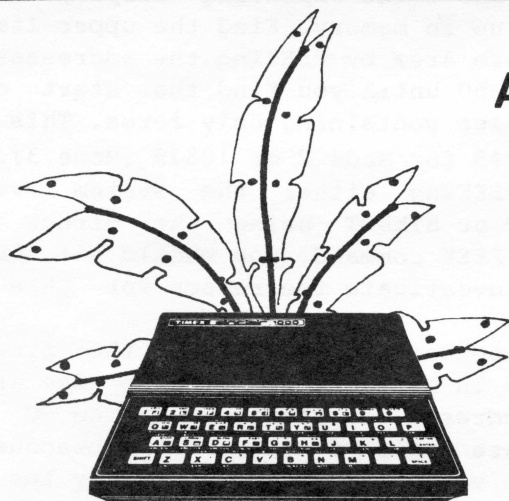
ADVENTURES IN THE RAM JUNGLE
AND OTHER MYSTERIES

CONCLUSION

by Earl V. Dunnington

The results presented in this article were obtained with a T/S 1500 and may differ from those obtained with the T/S 1000 without a 16K RAMPACK.

The readers with a T/S 1500 and those with a T/S 100 who own 3.25K or more of RAM have their choice of three trails (Operating Modes) they can use to traverse the RAM Jungle:
1. Both the Actual RAMTOP and the system variable RAMTOP set at or above address-19712.
2. Actual RAMTOP at or above address 19712, but the system variable RAMTOP POKEd to less than 19712, without ENTERing NEW.
3. Both the Actual RAMTOP and the system variable RAMTOP set below address 19712.

In all of the modes the program must be able to operate in the amount of RAM, to which Actual RAMTOP is set. Actual RAMTOP is one address higher than the top of the GOSUB stack (GS stack). Both Mode No.1 and Mode No.3 have a sub-mode available where the system variable RAMTOP is POKEd to an address

less than the Actual RAMTOP whithout ENTERing NEW. The T/S 1000 without an additional RAMPACK, has 2K RAM (maximum Actual RAMTOP address 18432) and can only use Mode No. 3 and Submode 3. The Submodes are used in a program when it is designed to store data or machine code in the Safe Area with NEW in a program line so that the strings and variables, along with the program, will be destroyed, in order that a new program can be LOADed that will utilize the data or machine code. Mode No.2 can also be used for this purpose. The main use of Mode No.2 is to save memory when a program will not operate in less than 3.25K RAM and a full screen is not used in the program. Mode No.2 can also be used when recording a program in order to save time or tape, as there are 768 bytes less in the display file to be recorded. Mode No.3 can also be used for this purpose. A program SAVEd while in Modes 2 or 3 can be LOADed into the computer when it is in Mode No.1.

Part One of this article (published SEPT/OCT '85) covered the GOSUB and Machine stacks also determining the upper limit of the Safe Area. Part Two of the article (pub-

lished NOV/DEC '85) covered the Calculator Stack (C stack) and determining, while in Mode No.1, the lower limit of the Safe Area and the minimum setting for RAMTOP, that would allow the program to operate. If a program will not use a full screen display, RAMTOP can be set even lower, saving additional memory above RAMTOP for storage of data. To determine this absolute minimum setting for RAMTOP that will allow the program to RUN and the computer to act normally, we can use either Mode No.2 or, if the program will operated in less than 3.25K of RAM, Mode No.3. For the purposes of illustration of the features of Mode No.2 to those readers with 3.25K or more RAM, we will use this mode for them. Readers owning the T/S 1000 but only 2K RAM will also be able to join in RUNning the examples, and obtain similar results.

Readers with more than 16K RAM, set RAMTOP to 32768 as follows:

```
ENTER POKE 16388,Ø
ENTER POKE 16389,128
ENTER NEW
```

All those readers with 3.25K RAM or more are now ready to cross over the Great RAM Divide, located at address 19712, into the domain of less than 3.25K RAM. We will do this by POKEing the system variable RAMTOP to address 18432 (the same as if we had 2K RAM) without ENTERing NEW as follows:

```
ENTER POKE 16388,Ø
ENTER POKE 16389, 72
ENTER CLS
```

A minimal display file has now been set up, but Actual RAMTOP is still 32768. To prove this, ENTER the following: PRINT PEEK 18431 The top of the GOSUB stack marker, decimal no. 62, will not be printed on the screen. If you PRINT PEEK 32767 it will be printed on the screen.

To prove that a minimum display file has been set up, PEEK the system variables VARS and D_FILE by ENTERing the following:

```
PRINT (PEEK 16400+256*PEEK 16401
)-(PEEK 16396+256*PEEK 16397)
```

The value displayed should be 25, the number of bytes in a minimum display.

To find the absolute minimum address to which we can set RAMTOP for Program One that we used as an example in Part Two of this article, we must type in the program and SAVE it on tape while in Mode No.2 (T/S 1000 2K RAM in mode No.3). Type in Program One as follows:

```
1Ø FOR N=1 TO 48
2Ø PRINT PEEK 16412+256*PEEK 1
6413;" ";
3Ø NEXT N
```

SAVE this program on tape.

As we want a completely clean memory in order to determine the upper limit of the Safe Area for Program One while in Mode No.2 (or 3), turn off the computer. Then power up. Those with over 16K RAM, set Actual RAMTOP to 32768 as covered above. All but those with 2K RAM, POKE the system variable RAMTOP to address 18432 without ENTERing NEW as you did before. Everyone LOAD and RUN Program One. Your results should agree with Figure No.1. Each time through the loop the program prints the value contained in the system variable STKEND and illustrates how everything above the expanding display file is moved up in memory. Find the upper limit of the Safe Area by PEEKing the addresses below RAMTOP-50 until you find the start of the Addresses containing only zeros. This should be 32715 for Mode 2 or 18379 (Mode 3).

PEEKing either the system variable STKEND or STKBOT using the direct double PRINT PEEK command, you should get 16667. We will investigate the reason for this value later.

Looking at Figure No.1, the first two values in line one and in line nine are not the addresses of the top of the C stack. They are due to a "Giant Bug", beacause the system variable STKEND is used by the Wicked Wizard of ROM for some other purpose than pointing to the address of the top of the C stack. What about the other values of Fig. No.1? Change line 20 of Program One to read:

```
2Ø PRINT PEEK 1641Ø+256*PEEK 1
6411;" ";
```

Each time through the loop the value stored in the system variable STKBOT will be printed. RUN the program and your results should agree with Figure No.2. Each time an address is printed, the bottom and the top of the C stack are moved up another six addresses as the display file is expanded by that amount. Note the correlation between Figures No.1 and No.2. The addresses in Figure No. 1, other than the first two of lines 1 and 9, are the same as those in Figure No.2, and are actually the addresses of the bottom of the C stack. Therefore we cannot locate the top of the C stack while the program is RUNning by inserting a line in the program to PEEK STKEND.

Let us investigate why we get 16667 as the bottom of the C stack using the direct

command to PEEK STKBOT or STKEND when the programs print the last value as 16912. When a direct command is ENTERed, the first thing that happens is the screen is CLEARed. As we are dealing with a minimal display file, the C stack is moved down before the command picks up the value stored in STKEND or STK-BOT, so we must add the number of characters on the screen to the 16667. The last six characters (including the space) are print-ed after the value is picked up. Therefore we have: 9*32-6=282 characters

The direct double PEEK command, as we found in Part Two of this article, increases the result by thirty-seven, so it must be sub-tracted. Therefore: 16667+282-37=16912
Which is the same as the last value of Figures No.1 and 2.

We can locate the maximum address of the top of the C stack during the RUNning of the program by laying down some fly-paper with Program Two of Part Two of this series. Changing line 10 to fit the new addresses, the program now reads as follows:

```
10 FOR N=16912 TO 17150
20 POKE N,5
30 NEXT N
```

N is from the last address to the highest address in Fig. No.1. The program places a 5 in each address from 16912 to 17150.
1) Type into the computer lines 10 and 20 of Program Two which will wipe out these lines of the previous program.
2) RUN the program
3) ENTER CLEAR
4) LOAD Program One from tape
5) RUN Program One
6) ENTER CLEAR
7) In Mode No.2 (or 3), with 288 bytes of screen display used, we do not have to de-lete any program lines.
8) Using the direct command: PRINT PEEK n
Where n is the address to be PEEKed, find the highest address whithout a 5. This ad-dress should be 16932 and is the top of the C stack when Program One is RUN and the com-puter is in Mode No.2 (or 3).

The formula for computing the minimum address to which we can set RAMTOP and have the program RUN and the computer act norm-ally, determined while in Mode No.2 (or 3), is: Top of the C stack+Actual RAMTOP-Upper limit of Safe Area+36
Substituting the addresses we found:
For Mode 2
16932+32768-32715+36=17021
For Mode 3
16932+18432-18379+36=17021
The High Byte of 17021 is:
INT(17021/256)=66

The Low Byte of 17021 is:
17021-256*66=125
To set RAMTOP to 17021:
ENTER POKE 16388,125
ENTER POKE 16389,66
ENTER NEW

LOAD Program One from the tape and the pro-gram will RUN properly.

As repetition is the core of learning, let us find the minimum setting for RAMTOP of a more practical program. Figure No.3 is an outline for a "bare bones" text entry program. When complete, it will display the text as it is entered, and store the text above RAMTOP. Line 80 redefines the ENTER key as the SPACE key, because both the PAUSE and INKEY$ functions turn the SPACE key into BREAK when shifted or unshifted. To quit text entry, use STOP. The STOP is stored as the end of the text marker (line 100). The
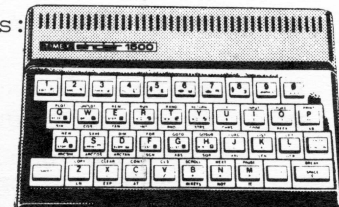

```
16886  16892  16642  16648  16654  16
560  16666  16672  16678  16684  1669
0  16696  16702  16708  16714  16720
16726  16732  16738  16744  16750  16
756  16762  16768  16774  16780  1678
6  16792  16798  16804  16810  16816
16822  16828  16834  16840  16846  16
852  16858  16864  16870  16876  1688
2  17144  17150  16900  16906  16912
```

FIGURE NO. 1


```
16630  16636  16642  16648  16654  16
660  16666  16672  16678  16684  1669
0  16696  16702  16708  16714  16720
16726  16732  16738  16744  16750  16
756  16762  16768  16774  16780  1678
6  16792  16798  16804  16810  16816
16822  16828  16834  16840  16846  16
852  16858  16864  16870  16876  1688
2  16888  16894  16900  16906  16912
```

FIGURE NO. 2


```
  5 FAST
 10 LET A=?????
 20 LET B=INITIAL RAMTOP-1
 30 LET C=1
 40 SCROLL
 50 FOR N=A TO B
 60 PAUSE 32767
 70 LET D=CODE INKEY$
 80 IF D=118 THEN LET D=0
 90 POKE N,D
100 IF D=227 THEN STOP
110 IF C<33 THEN GOTO 140
120 SCROLL
130 LET C=1
140 PRINT CHR$ PEEK N;
150 LET C=C+1
160 NEXT N
```

FIGURE NO. 3

minimum value for A in line 10 is what we need to determine.

1) To avoid crashing the computer, temporarily change line 90 to:

```
90 POKE 16393,D
```

This continually POKEs the text to an unused location in the system variables area. We must also change line 140 to:

```
140 PRINT CHR$ PEEK 16393;
```

2) Power up, ENTER line 90, and find the no. of bytes in the changed line by PEEK-ing 16511. In the same manner, find the mumber of bytes in the original line 90. The difference is 10. Find the difference between the changed line 140 and the original line 140, the difference is also 10.

3) Assuming we do not know if the program will RUN in less than 3.25K RAM, readers with this amount or more should chose Mode No.2 in determining the minimum setting for RAMTOP. To set Mode No.2, ENTER:

```
POKE 16388,0
POKE 16389,72
CLS
```

4) The Final value for variable A in line 10 will be the minimum setting for RAMTOP+1. Temporarily, since we will be working in Mode No.2 (or 3) and we need to exactly fill the screen with text, so that the display file will be expanded to the maximum for 22 lines, we will use A=B-703 bytes. Change line 10 to read:

For Mode 2
```
10 LET A=32064
```
For Mode 3
```
10 LET A=17728
```

5) Change line 20 to read:

For Mode 2
```
20 LET B=32767
```
For Mode 3
```
20 LET B=18431
```

6) Type the program as changed above into the computer and record the program on tape, while the computer is in Mode No.2 (or 3).

7) To insure a clean memory, turn off the power. Power up. Set Mode No.2 as in 3 above (3.25K RAM or over only). LOAD the "Text Entry" program. RUN the program, typing in text until the screen is filled and you get a 0/160 report. There is no cursor or correctional features!

8) Find the upper limit of the Safe Area by PEEKing the addresses near RAMTOP-50. This will be 32717 (T/S 1500 Mode No.2) or 18389 (T/S 1500 Mode No.3, Actual RAMTOP at 18432) As you can see, setting Mode 3 in the T/S 1500, not only sets up a minimum display file, but also changes the operating system as regards the M stack. To be on the safe side, never use a value for the upper limit

of the Safe Area less than RAMTOP-51.

9) To find the initial value for N in the "Flypaper" program, ENTER:

```
PRINT PEEK 16404+256*PEEK 16405
```

The value of the address of E__LINE is 16838 To this add 704 which is the number of addresses E__LINE is moved up when the display file is expanded. The top of the C stack should never be more than 50 addresses higher than the actual address of E__LINE during the program RUN.

10) To wipe out the program, turn the power off and then on. Set Mode No.2 as in (3) above. Type in the modified "Flypaper" program:

```
10 FOR N=17542 TO 17592
20 POKE N,5
30 NEXT N
```

RUN this program.

11) ENTER CLEAR, LOAD and RUN the Text Entry program, typing in text until you get a 0/160 report. PEEK up from 17542 to find the top of the C stack. THis should be 17551. Correcting this value for the extra 20 bytes we added to the program, the final value for the top of the C stack, is 17531.

12) Substituting in the formula for the minimum address to which we can set RAMTOP in Mode 2 (or 3):

Top of the C stack+Actual RAMTOP-upper limit of Safe Area+36

we get 17618. Set RAMTOP to this value:

```
POKE 16388,210
POKE16389,68
NEW
```

13) LOAD Text Entry program and change the following lines:

```
10 LET A=17619
90 POKE N,D
140 PRINT CHR$ PEEK N;
```

14) SAVE and RUN. You can type in 15149 characters that will be stored above RAMTOP (16K). 813 with 2K RAM.

```
 5  FAST
10 LET A=?????
20 LET B=INITIAL RAMTOP-1
30 FOR N=A TO B
40 IF PEEK N=227 THEN STOP
50 LPRINT CHR$ PEEK N;
60 NEXT N

      FIGURE NO. 4
```

Figure No. 4 is a companion program to be loaded after text entry, to print the text on a printer.

I hope you have enjoyed your Safari in the RAM Jungle as much as I have, being your guide.

CHROMA-SOFT
Review by Dick Wagner

CHROMA-SOFT is "Experimental Software Color Graphics" for the T/S 1000/1500 and ZX81 computers.

For those who would like to enlist their computer in some interesting experiments in color illusions, this program offers a rare opportunity to investigate "Subjective Coloring". Bill Russell, developer of the computer concept, has worked out a very interesting program that will produce in a graphic manner the colors: RED, YELLOW, BLUE, CYAN, and GREEN.

The taped program provides an image that does this very thing (for some people). The user can also produce images of choice as Bill provides the parameters for doing this. Granted, there are restrictions as to image drawing in terms of space between different colors. Two methods of drawing are provided. One is to draw the shapes by what amounts to PLOT, as the lines are 1/4 character size. The second method is more complicated as it is more like defining GRAPHIC shapes by using the GRAPHIC keys and character keys, and specifying spaces down and spaces over for the graphics you want. This method permits the use of letter shapes as well as graphic shapes.

There is provision in the program to SAVE graphic shapes, so that further study/demonstration is possible. You can even alter a shape after it is LOADed, thus experiment with different degrees of color separation.

The method developed to give a color effect is to produce each different color by vibrating or pulsing the black image that corresponds to the part of the picture that is assigned that color. This is done, by simply specifying a color for those parts to be so colored. Each color pulses at a different rate that has been determined by tests. The experimentor can vary the black/white flashing rates to study this phenomena.

How well does this illusion work? It is indeed in the eyes of the beholder (or maybe the brain?), as different people see the "colors" differently. There are factors that influence just how the colors appear, such as viewing distance from the screen, room light brightness (no flourecent light, the manual says) the viewers physical state, ect. For myself, the pulsing did a bit to my stomach and my wife simply said, "turn it off". At a recent demonstration for our User Group, some half dozen members offered such comments as "couldn't see the colors", "RED was the only color showing", "the colors were not bright or defined", "depends where I stand", "I can see the GREEN", "I can't see the GREEN", ect.

The concensus of viewers was that for some, there was color, but very dim or muddy. The author makes no pretense about this as the system is intented to produce an illusion in the mind that there is color.

The demonstration image [supplied on the tape], full screen, had me puzzled as to where the green color existed, so I printed the screen for each color on a 2040 printer. The image for each color was then known, so I studied the screen again knowing which lines to look for. I doubt that this convinced me. I haven't yet persued a study to enchance the colors.

This program can provide considerable discussion for groups as it certainly brings up to date a method, first discovered 100 years ago, of stimulating the nervous system with pulsing black and white.

The documentation is very good, written in the Bill Russell "style". Besides a complete instruction of use, he has included an explanation of the BASIC program, and also the machine language with mnemonics and addresses, and a description. This is a treat in itself. There is also provided a cut-out Benham Subjective Color Disk, to try the original experiments. He also provides an amber-colored screen filter (10 x 12 inches) to be taped over the B&W TV screen. Price for the CHROMA-SOFT program on cassette is $14.95 from Russell Electronics, RD 1, Box 539, Centre Hall, PA 16828.

The Old Shell Game

This program runs on the T/S 2068 and is self-explanatory.

By Jack Armstrong

```
  5 REM  THE OLD SHELL GAME
    ©1985 JACK ARMSTRONG
 10 BORDER 5: INK 1: PAPER 6: C
LS : LET M=0
 15 DIM S$(3): DIM P$(1): GO SU
B 20: GO TO 50
 20 FOR k=-5 TO 7: BEEP .05,k:
NEXT k: CLS : PRINT INK 2,AT 7,6
;
 30 PRINT FLASH 1;AT 8,6;" THE
OLD SHELL GAME"
 40 PRINT INK 2;AT 9,6;"
             ": PAUSE 120: RETUR
N
 50 GO SUB 3030
 60 GO SUB 3000
 70 FOR K=1 TO 3: LET S$(K)=CHR
$ (K+143): NEXT K: LET P$=CHR$ 1
47
 80 PRINT ''''"Hi There! My na
me's Tim Sinclair": POKE 23658,8
 90 PRINT ''''"What is your na
me?": INPUT n$: PAUSE 60: CLS
100 PRINT '''''"Well, Now-";n$;
"."
110 PRINT ''"Do you, by any chan
ce, have a"
120 PRINT ''"bit of gambling blo
od in you?"
130 PRINT '''"Input your answer:
Y(es) or N(o)": PAUSE 0: LET Q$
=INKEY$
140 IF Q$<>"Y" AND Q$<>"N" THEN
CLS : GO TO 130
150 IF Q$=CHR$ 78 THEN GO TO 61
0
160 CLS : PRINT ''''"Well now,
";n$;" they call this ": PAUSE
120
170 CLS : GO SUB 20
180 PAUSE 60: CLS
190 PRINT ''''"Here's the deal
",n$
200 PRINT ''"I have these three
shells...";''TAB 10; INK 2;S$;" "
;S$;" ";S$
210 PRINT ''"And I have this lit
tle pea...."; INK 4;P$: PAUSE 180
220 GO SUB 1000
230 PAUSE 60: CLS
240 PRINT ''''"Here's the deal "
;n$;"..."
250 PRINT ''"I'll put the pea un
der a shell,"
260 PRINT ''"Mix them up...Then
YOU guess..."
270 PRINT ''"Which shell is the
pea under... ";''TAB 11;"1 - 3 o
r 2"
280 PRINT ''"Just to make things
interesting"''"Let's make a li
ttle wager on it." LET m=10
290 PRINT ''"Press ENTER to con
tinue...": PAUSE 0: CLS : PRINT
''"How much do you want to bet th
at"
300 PRINT ''"You can guess corre
ctly?"
310 PRINT ''"Since we are frien
ds here, let's"
320 PRINT ''"make some limits-sa
y you have",''"$10.00 and you ca
n bet any even"
330 PRINT ''"amount from $1 to $
10 as long as"''"you have the mo
ney to bet."
340 PRINT '''''"Press ENTER to
continue...": PAUSE 0: CLS : PRI
NT ''''"PLACE YOUR BET. Please
enter the"
350 PRINT ''"number only. Don't
use the ($)"''"dollar sign-just
the number."
360 PRINT AT 21,0;"You have $";
m;" in your poke": INPUT bet: P
AUSE 60: CLS
370 IF bet>m THEN GO TO 410
380 IF bet>10 THEN GO TO 410
390 LET m=m-bet
400 IF bet>=1 AND bet<=10 THEN
GO TO 430
410 PAUSE 60: CLS : PRINT ''''
"Come, come, Sport-I'm no sucker
..."
420 PRINT ''"Quit trying to con
me-Make your bet!": IF bet>M OR
bet>10 THEN PRINT ''"You can't b
et more than $10.00 or more tha
n is in your poke.": LET bet=0:
PAUSE 180: CLS : GO TO 340
430 PRINT ''''"O.K., Sport...H
ere we go..."
440 GO SUB 20: GO SUB 1000
450 LET P=INT (RND*3)+1
460 PRINT ''''"Well, Now, ";n$;
"..."
470 PRINT ''"Where's the Pea?":
INPUT "What's your guess:";g
480 CLS : IF g<1 OR g>3 THEN GO
TO 450
490 PRINT ''''"O.K., Sport, gl
ad you made that"
500 PRINT ''"Choice-Let's see no
w..."'' IF g=p THEN LET m=m+2*bet
510 IF g<>p THEN GO TO 670
```

```
520 PAUSE 120: CLS : GO SUB 800
: PAUSE 60
530 PRINT ''''"How about that, Sp
ort-You made a"
540 PRINT ''"good guess...Now yo
u have $";m;"."
550 PRINT ''"Want to try again?
If you feel"
560 PRINT ''"lucky, Input (Y)es
or if you are"
570 PRINT ''"just a piker-Input
N(o)": INPUT f$: PAUSE 60: CLS
580 IF f$="N" THEN GO TO 610
590 IF f$="Y" THEN GO TO 340
600 IF f$<>"Y" OR f$<>"N" THEN
PRINT ''"Hey, Sport, Y or N only.
": PAUSE 120: CLS : GO TO 550
610 PAUSE 60: CLS : PRINT '''''
"O.K., Sport, No hard feelings..
."
620 PRINT ''"See you around, ";n
$;"..."
630 PRINT ''"You had $";m;" left
..."
640 PRINT ''"If you'd like to tr
y again,"
650 PRINT ''"Press R for a re-ru
n...": PAUSE 0: IF INKEY$="R" TH
EN RUN
660 PAUSE 60: CLS : STOP
670 PAUSE 60: CLS : PRINT ''''
"The Pea was under...": GO SUB 8
00
680 PAUSE 60: CLS : PRINT ''''
"Sorry, Sport-you missed that on
e"
690 PRINT ''"You now have $";m;"
left."
700 IF M<1 THEN GO TO 740
710 PRINT ''''"If you want to
try again Press"
720 PRINT ''"Y(es), if not Press
N(o).": PAUSE 0: IF INKEY$="Y"
THEN GO TO 340
730 IF INKEY$="N" THEN GO TO 61
0
740 PAUSE 60: CLS : PRINT ''''
"If you'd like to play again..."
750 PRINT ''"Press R to Re-Run..
.": PAUSE 0: IF INKEY$=CHR$ 82 T
HEN RUN
760 STOP
800 PAUSE 60: CLS : PRINT '''''
"The Pea was under..."
810 PRINT INVERSE 1;AT 8,(8 AND
P=1)+(16 AND P=2)+(24 AND P=3);
P
820 PRINT INK 2;AT 10,3;"
         ",AT 10,(8 AND
P=1)+(16 AND P=2)+(24 AND P=3);
INK 4;P$: PAUSE 120: RETURN
999 STOP
1000 REM
1010 CLS
1020 LET v=10: LET h=5: FOR l=1
TO 3
1030 IF l=2 THEN LET h=h+10
1040 IF l=3 THEN LET h=h+10
1050 PRINT INK 2;AT v,h;s$
1060 NEXT l
1070 PRINT AT 8,6;"1";AT 8,16;"2
";AT 8,26;"3"
1080 LET D=10: FOR L=1 TO 14
1090 LET X=(RND*30)+1: IF X<=10
THEN LET X=6
1100 IF X>10 AND X<=20 THEN LET
X=16
1110 IF X>20 THEN LET X=26
1120 PRINT INK 4;AT D,X;P$: PAUS
E 10
1130 PRINT INK 2;AT D,X;S$(2): P
AUSE 5
1140 NEXT L
1150 RETURN
3000 REM
3010 CLS : PRINT '''''"To Play T
his Game..."''"Follow Instructio
ns Carefully..."''"Press ENTER a
fter each Input or just press th
e key required."''TAB 11;"Good L
uck!"
3020 PRINT AT 18,0;"Press ENTER
to Start...": PAUSE 0: CLS : RET
URN
3030 REM
3040 FOR a=USR "a" TO USR "d"+7
3050 READ user: POKE a,user: NEX
T a: RETURN
3060 DATA 0,3,12,16,32,64,128,25
5
3070 DATA 60,195,0,0,0,0,0,255
3080 DATA 0,192,48,8,4,2,1,255
3090 DATA 24,125,250,247,239,94,
125,24
4000 REM
4010 SAVE "@5,shell" LINE 10
4020 FOR k=-5 TO 7: BEEP .05,k:
NEXT k
```

14
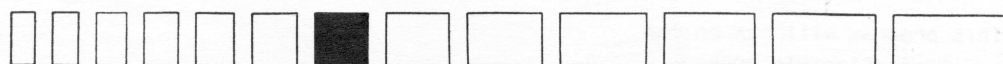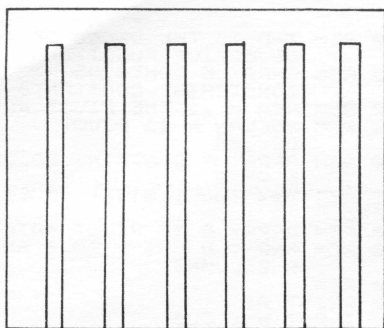
Technical Applications For T/S Computers

LINEAR PROGRAMMING

by Dennis Parry

Linear Programming, is the minimazation or maximazation of a linear form, subject to linear constraints, containing non-negative variables. The program I have written, uses the "simplex" method to do this.

The linear constraints are used to model certain physical situations, and the linear form that is optimized, tells how the situation that has been modeled, reacts to changes in the variables.

The program that I have written finds the mimimum of the linear function and the value of the variables used. The array S contains the column numbers of the variables having been solved-for, starting with the first equation and going on down to the last constraint equation. For example:

$$\text{minimize } Z= -x_3 \text{ subject to}$$
$$x_1 \quad +5x_3 \quad\quad =1$$
$$\quad x_2 + x_3 \quad\quad =6$$
$$\quad\quad -x_3 + x_4 =5$$
$$x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0,\ x_4 \geq 0$$

$$x_1= 1-5x_3$$
$$S=(1,2,4) \text{ since } x_2= 6- x_3$$
$$x_4= 5+ x_3$$

consider the example:
$$\text{minimize } Z=-x_1$$
$$x_1 + x_2 \quad =5$$
$$2x_1 \quad\quad +x_3=1$$
$$x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0$$

In the computer program the constant in the function Z (i.e.; D) is zero.
The array $C= (-1,0,0)$ since the coefficients of x_3 and x_2 must be zero in the algorithm.
The array $S= (2,3)$
The array $A= \begin{pmatrix} 1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix}$
The array $E= (5,1)$
The array $B= \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ initially

The array F is used to transform the array B in each cycle of the algorithm. Note: The coefficients of the basic variables in Z must be made zero.

Here is a problem that is sovable by Linear Programming: A company makes wooden dowels. They make three sizes; 1/4", 1/2", and 3/4" in diameter, with a fixed length of three feet. They sell for one, two and three dollars per dozen respectively. Fifty of 1/4 and 3/4 inch dowels, together can be be made from one piece of wood (if the wood is good). Seventy-five of the 1/4 and 1/2-inch dowels can be made if the wood is good.

To conserve wood, two 1/4-inch dowels are made after each 3/4-inch dowel is made. How many of each size dowel, should be made to maximize profit, from each piece of wood?

maximize
$$Z= \$1.00\ x_1 + \$2.00\ x_2 + \$3.00\ x_3 \text{ subject to}$$
$$2\ x_1 + \quad\quad\quad + 1\ x_3 \leq 50$$
$$1\ x_1 + \quad 1\ x_2 \quad\quad \leq 75$$
$$x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0,\ X_4 \geq 0,\ X_5 \geq 0$$

To minimize Z, we take the negative of $-Z$, i.e.; $-(-Z)$. The answer: $x_3=50$, $x_2=75$, $z= \$300.00$, $x_1=x_4=x_5=0$

where $x_1=$ the number of 1/4" dowels made
$x_2=$ the number of 1/2" dowels made
$x_3=$ the number of 3/4" dowels made

To put the problem in a form the computer can use, we need to add slack variables x_4, and x_5 where both $x_4 \geq 0$ and $x_5 \geq 0$. then the problem is:

maximize
$$Z= \$1.00\ x_1 + \$2.00\ x_2 + \$3.00\ x_3$$
$$2\ x_1 \quad\quad + x_3 + x_4 + 0\ x_5 =50$$
$$x_1 + x_2 \quad\quad +0x_4 + \quad x_5 =75$$
$$x_i \geq 0 \quad (i= 1,2,3,4,5)$$

and we find $(-\text{ minimum } (-Z))$.

A good reference [for further information]: "LINEAR OPTIMIZATION" by Spivey, W. Allen, and Thrall, Robert M., Copyright 1970 by Holt, Rinehart and Winston, Inc.

This program will run on the Timex/Sinclair 2068

This program will run on the
Timex/Sinclair 2068

```
100 REM PROGRAM SIMPLEX
110 REM THE PROGRAM SOLVES A
120 REM LINEAR PROGRAMMING
130 REM PROBLEM IN CANONICAL
135 REM FORM
137                          REM
140 GO SUB 7000
155 GO SUB 1090
160 IF K=Z THEN GO SUB 1725
165 GO SUB 1170
170 GO SUB 1320
180 GO SUB 1430
190 GO SUB 1510
200 GO SUB 1680
210 GO TO 155
220                          REM
1090 REM COMPUTE NEW C AND FIND
          MINIMUM C(I)
1095 LET K=Z
1100 FOR I=0 TO N
1110     LET X=Z: LET Y=Z
1120     FOR J=T TO S
1130         LET X=X+B(0,J)*A(J-
0,I)
1140     NEXT J
1145 LET X=C(I)+X
1150 IF X>=Y THEN GO TO 1160
1155 LET Y=X: LET K=I: LET F(0)=
X
1160 NEXT I
1164 REM IF K=0, THEN STOP ;
          OPTIMAL SEQUENCE
1165 RETURN
1167                          REM
1170 REM FIND min b(i)/a(i,k),
          a(i,k)>0
1190 LET L=Z
1200 FOR I=T TO S
1210     LET X=Z
1220     FOR J=T TO S
1230         LET X=X+B(I,J)*
          A(J-0,K)
1240     NEXT J
1260     LET F(I)=X
1265     IF X>Z THEN LET L=0
1270 NEXT I
1280 REM
1300 REM IF L<>0 THEN LET COST B
0         UNDED
1305 IF L<>0 THEN PRINT AT T+0,0
;H$ : STOP
1315 RETURN
1320 LET Y=1000
1325 REM
1330 FOR I=T TO S
1340     IF F(I)<=Z THEN GO TO
          1390
1350         LET X=E(I-0)/F(I)
1360         IF X>=Y THEN GO TO 1390
1365         LET J=I
1370         LET H=J-0: LET Y=X
1390 NEXT I
1400 REM
1410 LET S(H)=K: RETURN
1430 REM FORM INVERSE MULTIPLIER
1435 LET Q=F(H+0)
1440 LET F(0)=-F(0)/Q
1450 REM
1460 FOR I=T TO S
1470     LET F(I)=-F(I)/Q
1480 NEXT I
1490 REM
1500 LET F(H+0)=0/Q: RETURN
1510 REM MULTIPLY ARRAY B BY
          ARRAY F
1520 REM
1530 FOR I=0 TO S
1532     IF I=H+0 THEN GO TO 15
70
1540     FOR J=T TO S
1550         LET B(I,J)=B(I,J)+F
(I)*B(H+0,J)
1560     NEXT J
1565
1570 NEXT I
1580                          REM
1590 LET I=T: LET B(H+0,I)=B(H+0
,I)*(0/Q): LET I=I+0
1620 IF I>S THEN RETURN
1630     LET B(H+0,I)=B(H+0,I)*(0
/Q)
1640     LET I=I+0: GO TO 1620
1670 REM
1680 REM MULTIPLY E(*), BY F(*)
1685 LET X=F(H+0)*E(H)
1687                          REM
1690 FOR I=T TO S
1695     IF H=I-0 THEN GO TO 171
0
1700     LET E(I-0)=E(I-0)+F(I)*
E(H)
1710 NEXT I
1712                          REM
1715 LET E(H)=X: RETURN
1725                          REM
1730 REM PRINT OPTIMAL VALUE AND
          OPTIMAL PROGRAM
1765 CLS
1775 PRINT "THE OPTIMAL PROGRAM
IS"
1780 REM PRINT OPTIMAL PROGRAM
1790 FOR I=0 TO P
1795     LET D=D-C(S(I))*E(I)
1800     PRINT "X";S(I);"=";E(I)
1810 NEXT I
1815 PRINT "WHERE Z= ";-D
1820                          REM
1830 PRINT V$: STOP
1900                          REM
7000 LET Z=PI-PI
7005 LET X=Z
7010 LET O=PI/PI
7020 LET T=0+0
7030 LET A$=" INPUT THE NUMBER O
F VARIABLES   IN THE PROBLEM"
7031 LET W$="THE OPTIMAL PROGRAM
IS:"
7032 LET V$="WHERE THE OTHER VAR
IABLES        EQUAL ZERO."
7040 LET B$=" INPUT THE NUMBER O
F CONSTRAINTS"
7045 LET C$="THE COEFFICIENT OF
XI        IN EQUATION J IS?"
7050 LET D$="THE CONSTANT IN THE
OBJECTIVE    FUNCTION IS?"
7060 LET E$=" INPUT THE BASIC SE
QUENCE"
7070 LET F$=" INPUT THE CONSTRAI
NT CONSTANTS."
7080 LET G$=" INPUT THE COEFFICI
ENTS IN THE  OBJECTIVE FUNCTION"
7090 REM ARRAY C CONTAINS COST
          COEFFICIENTS
7095 LET H$="THE OBJECTIVE FUNCT
ION IS        UNBOUNDED"
7110 REM ARRAY A CONTAINS
          INITIAL TABLEAU
7120 REM ARRAY B CONTAINS
          INVERSE OF BASIS
7140 REM Z-D IS THE VALUE OF THE
          OBJECTIVE FUNCTION
7150 REM ARRAY E CONTAINS
          CONSTRAINT CONSTANTS
7160 REM ROW H IS THE PIVOT ROW
7170 REM COLUMN K IS PIVOT
          COLUMN
7180 REM ARRAY T CONTAINS COLUMN
          K OF A
7185 LET Y$="THE C(S(I)), MUST B
E ZERO."
7190 REM ARRAY F IS PIVOT MATRIX
7210 REM ARRAY A HAS P ROWS AND
          N COLUMNS
7220 REM
7230 PRINT A$
7240 INPUT N : CLS
7250 PRINT B$ : INPUT P : LET S=
P+0 : CLS
7260 DIM S(P) : DIM B(S,S)
7270 DIM C(N) : DIM E(P): DIM F(
S): DIM A(P,N)
7280 PRINT C$
7285                          REM
7290 FOR I=0 TO N
7300     FOR J=0 TO P
7310         PRINT AT Z,20;I,AT
          0,12;J
7320         INPUT A(J,I)
7330     NEXT J
7340 NEXT I
7350                          REM
7355 CLS
7356                          REM
7360 FOR I=0 TO S
7370     LET B(I,I)=0
7380 NEXT I
7390                          REM
7400 PRINT E$: PRINT
7405                          REM
7410 FOR I=0 TO P
7420     INPUT S(I)
7440     PRINT "S(";I;") = ";S(I)
7450 NEXT I
7460                          REM
7463 PRINT "PRESS ANY KEY TO CON
TINUE."
7465 PAUSE Z
7470 CLS
7480 PRINT F$: PRINT
7485                          REM
7490 FOR I=0 TO P
7500     INPUT E(I)
7510     PRINT "E(";I;") =";E(I)
7520 NEXT I
7525 PRINT "PRESS ANY KEY TO CON
TINUE."
7530                          REM
7535 PAUSE Z
7540 CLS
7550 PRINT G$: PRINT
7555                          REM
7560 FOR I=0 TO N
7570     INPUT C(I)
7580     PRINT "C(";I;") =";C(I)
7590 NEXT I
7595 FOR I=1 TO P
7596     IF C(S(I))<>Z THEN PRIN
T Y$: STOP
7597 NEXT I
7600 REM
7601 PRINT "PRESS ANY KEY TO CON
TINUE."
7605 PAUSE Z
7610 CLS
7620 PRINT D$: PRINT
7630 INPUT D: PRINT TAB 15,"D=";
D: PRINT "PRESS ANY KEY TO CONTI
NUE.": PAUSE Z: LET D=-D : CLS :
RETURN
```

TURBOS

by Rick Borland

"TURBOS" is a computer program that I wrote for engine building enthusiasts. I will try to explain how it works and what it does.

By taking an engine that has no turbo, blower, ect., and using it's rated horsepower, the rpm's it was rated at, and the engine's cubic inch displacement, one can figure the cubic feet of air flow through the engine and thus calculate new horsepower
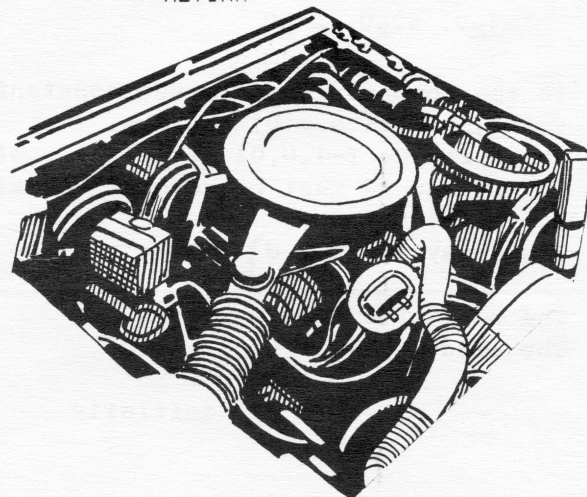
ratings and cfm rates at different turbo boost pressures. Most "outright" sold turbo systems have 6 to 15 psi boost. Racing and pulling engines have higher boosts. But anyway you look at it, heat is generated when air is compressed, thus creating new problems at higher boost figures. Cooling the incoming turbo-compressed air, helps to increase power at lower temperatures. This method is called "intercooling", and can be done in the outside air, or through the engine's cooling system (thermostat temperature). At low boosts, intercooling is not helpful, but actually hinders results. But calculated results are interesting. Actual engine results will be slightly less due to friction.

Use the program as follows. Input all figures asked for, keeping in mind that outdoor ambient temperature ratings are almost always 70°F or 80°F when calculating engine figures. Engines rated in size by "cc", can be converted (1 liter = 1000cc = approx. 61 cubic inches).

When entering cooling modes, air to air will be outdoor temperature in "F°", and air to water will be the engine's thermostat setting "F°". The program rounds out all calculations to the nearest hundreth.

All calculations in the program, as far as temperature go, are figured in "absolute temperature". Everything else in the program comes from physics of turbos, derived from formulas used by tractor manufacturers, but works well for almost all calculations of engines. The program prints out on a standard Timex 2040 (or comparable) printer.

Any questions? Please direct them to me and I'll answer them as best as I can.

This program will run on the T/S 2068

```
5 REM "SAVE "TURBOS" LINE 0
7 DEF FN X(A)=INT ((.005+A)*1
00)/100
10 PRINT "THIS PROGRAM FIGURES
"'"TURBOCHARGING A NORMALLY"
" ASPIRATED ENGINE."'"IT TAKES
 INTO CONSIDERATION"'"THAT A TU
RBO IS 65%"'"EFFICIENT AND INT
ERCOOLING "'"IS 70% EFFICIENT."
15 PRINT : PRINT "HIT [ENTER]
TO CONTINUE."
20 PAUSE 0
30 INPUT "DISPLACEMENT OF ENGI
NE(CU.IN.)? ";CUIN
40 INPUT "RATED HORSEPOWER?";H
P
50 INPUT "RPM HORSEPOWER WAS R
ATED AT? ";RPM
70 INPUT "OUTDOOR AMBIENT TEMP
ERATURE? (F)";TEMP
75 INPUT "AMOUNT OF BOOST OF T
URBO? (PSI) ";BOOST
80 LET CFM=.85*(CUIN*RPM/(2*17
28))
90 LET P1=14.7
100 LET P2=BOOST+14.7
110 LET T1=TEMP+460
120 LET T2=T1*(P2/P1)^.283
130 LET TEMPRISE=(T2-T1)/.65
140 LET TEMPOUT=TEMPRISE+TEMP
150 LET DENRATIO=(T1/T2)*(P2/P1
)
```

```
160 LPRINT "ENGINE DISPLACEMENT
=";CUIN
165 LPRINT
170 LPRINT "RATED HP=";HP;" AT
";RPM;" RPM"
180 LPRINT
185 LPRINT "CFM AIR THRU ENGINE
NON-PSP.=";FN X(CFM): LPRINT
190 LPRINT "OUTDOOR TEMP(F)=";T
EMP: LPRINT
195 LPRINT "TURBO BOOST=";BOOST
;" PSI": LPRINT
200 LPRINT "EST. TEMP. OUT OF T
URBO=";FN X(TEMPOUT): LPRINT
220 LPRINT "NEW CFM AIR FLOW=";
FN X(CFM*DENRATIO): LPRINT
230 LPRINT "NEW HP=";FN X(DENRA
TIO*HP)
240 LPRINT : LPRINT
250 INPUT "WANT TO CHECK ON INT
ERCOOLING? (Y/N)";A$
260 IF A$="Y" THEN CLS : GO SUB
500
270 INPUT "WANT TO SEE ANOTHER
BOOST VALUE? (Y/N)";B$
280 IF B$="Y" THEN CLS : GO T
O 75
290 INPUT "WANT TO FIGURE A DIF
FERENT     ENGINE? (Y/N)";C$
300 IF C$="Y" THEN CLEAR : CLS
: GO TO 30
310 GO TO 1000
500 PRINT "INTERCOOLING CAN BE
DONE TWO  WAYS,"'"     1)AIR T
O AIR "'"     2)AIR TO WATER.
510 PRINT "IN AIR TO AIR PUT I
N OUTDOOR "'"AMBIENT AIR TEMPERA
TURE."'"IN AIR TO WATER PUT IN
ENGINE"'"THERMOSTAT TEMPERATURE
."
520 INPUT "COOLING MODE (1/2)?"
;Z
530 IF Z<1 OR Z>2 THEN GO TO 51
5
540 INPUT "COOLING MODE TEMP.
(F)";CMT
550 LET NEWTEMP=TEMPOUT-((TEMPO
UT-CMT)*.70)
560 LET X=NEWTEMP-TEMP
570 LET NEWT2=X*.65+T1
580 LET NEWDENRATIO=(T1/NEWT2)*
(P2/P1)
590 LET NEWHP=HP*NEWDENRATIO
600 LET NEWCFM=CFM*NEWDENRATIO
610 IF Z=1 THEN LPRINT "AIR TO
AIR COOLING"
620 IF Z=2 THEN LPRINT "AIR TO
WATER COOLING"
630 LPRINT "COOLING MEDIUM TEMP
.=";CMT: LPRINT
640 LPRINT "TEMP. OUT OF TURBO=
";FN X(NEWTEMP): LPRINT
650 LPRINT "CFM=";FN X(NEWCFM):
LPRINT
660 LPRINT "HP=";FN X(NEWHP): L
PRINT
670 LPRINT "INTERCOOLING LOWERE
D TEMP";FN X(TEMPOUT-NEWTE
MP);" DEGREES": LPRINT
680 LET V=TEMPOUT-NEWTEMP
690 IF V>0 THEN GO TO 720
700 LPRINT "INTERCOOLING AT THI
S LOW "'"BOOST IS NOT BENEFICIAL"
710 LPRINT : LPRINT : RETURN
720 LET M=-14.7+(DENRATIO*14.7*
NEWT2)/T1
725 LPRINT "YOU COULD LOWER YOU
R BOOST "'"TO ";FN X(M);" PSI AND
STILL RETAIN"'"ORIGINAL HORSEPO
WER."
730 LPRINT : LPRINT
740 RETURN
1000 STOP
```
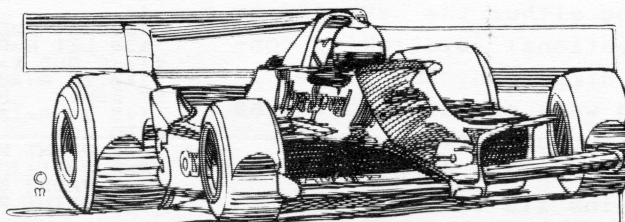
A Mickey Mouse Solution To A Graphic Problem

by Duncan Teague

Attention users of the ZEBRA GRAPHICS TABLET. Are you tired of having the cursor "spray" all over your screen when you use the Zebra Painter software? Are you carving little grooves into the surface of the Koala Pad in an attempt to keep stray marks from appearing in your graphic creations? Would you like to be able to hold that cursor still? Want to use a MOUSE with TECH-DRAW, the program that emulates Apple's Mousepaint?

Well you can! Next time you visit your local Radio Shack to pick up a couple of rolls of thermal paper for your ZX or 2040 printer, take a look at their TRS-80 COLOR MOUSE. You'll notice that the little plug at the end of the Mouse cable looks a lot like the socket in the Zebra Graphics Tablet interface. The only thing missing is the center pin. Is the little light bulb appearing in the balloon above your head?

The Color Mouse will work just fine once the software is initialized. Load your Tech Draw software, for example, and activate the program by pressing the "Command" button on the Koala Pad. Then carefully extract the graphics tablet's plug from the interface socket. Plug in the Color Mouse cable. Enjoy!

The Color Mouse will allow a degree of control over the cursor unobtainable with the stylus and graphics tablet. If you release the Color Mouse, the cursor just sits there and blinks. If you move the Color Mouse over the table or desk top, the cursor follows its movement. When you press the button on the Color Mouse, menu selections can be made, and drawing is accomplished with incredible ease.

The Color Mouse will not give you more artistic talent than you already possess. But it will allow you to produce graphics in far less time because of the stability of the cursor. The Color Mouse is Catalog No. 26-3025, and it costs $49.95 at your local Radio Shack.

[Editor- Zebra Systems will sell the TECH DRAW software and the Graphics Tablet's interface (excluding the Kola Pad) separately if a user wanted to adapt the Color Mouse. Write or call for further information and prices: 78-06 Jamaica Ave., Woodhaven, NY 11421, (718) 296-2385]

Radio Shack's Color Mouse
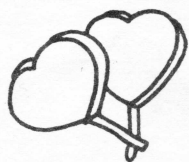
LOLLIPOPS

by Warren Fricke

Author's Program Notes:
"LOLLIPOPS was intended for the younger generation. Of course, we grown-ups can enjoy it too as the game is both addictive and challenging. This program is arranged to allow a player to use either the keyboard or a conventional joystick to control direction. The latter works well on this program as only two directions are involved, up and down. LOLLIPOPS contains its own set of instructions on how to play the game."

```
5 REM  ** LOLLIPOPS **
              by
          Warren Fricke
6
7
10 GO SUB 300
20 RANDOMIZE : GO TO 420
30 BORDER 6: PAPER 7: CLS
35 FOR n=1 TO 10: PRINT BRIGHT
1; PAPER 7;AT 19*RND+1,15*RND+8
;" ": NEXT n
40 FOR n=1 TO 75
50 PRINT PAPER 6-INT (7*RND*RN
D);AT 19*RND+1,29*RND+1;" "
60 NEXT n
70 LET L=11: LET C=1: LET k=1
80 LET p=0: LET s=0: LET t=0
90 LET LL=L: LET CC=C
95 POKE 23658,8
100 IF C<1 OR C>28 THEN LET k=-
k
105 LET a$=INKEY$: LET ST= STIC
K (1,1)
110 LET L=L+((a$="Z" OR ST=2) A
ND L<20)-((a$="Q" OR ST=1) AND L
>1)
120 LET C=C+k
130 LET A=ATTR (L,((C+2) AND k=
1)+(C AND k=-1))/8
140 IF A<=6 THEN BEEP .05,25: L
ET p=p+1: LET s=s+(7-A)↑2
145 IF A=15 THEN BEEP .5,-35: G
O TO 200
150 PRINT PAPER 7;AT L,C;("--O"
AND k=1)+("O--" AND k=-1)
160 PAUSE 5
170 PRINT PAPER 7;AT LL,CC;"
180 LET t=t+1: IF t>=300 THEN G
O TO 200
190 GO TO 90
200 PRINT FLASH 1;AT 0,9;" GAME
IS OVER ": PAUSE 120
210 PRINT AT 0,2;"Press C-KEY,
or FIRE BUTTON,       to play
again."
220 PRINT AT 21,0;"You got ";p;
" pops.";AT 21,20;"Score =";s
230 IF STICK (2,1)=1 OR INKEY$=
"C" THEN GO TO 30
240 GO TO 230
300 PRINT FLASH 1;AT 0,7;" ** L
OLLIPOPS ** ": RETURN
420 PRINT AT 2,0;"YOUR LOLLIPOP
SWEEPS LEFT AND, RIGHT, BACK A
ND FORTH ABOUT 10 TIMES, THRU A
FIELD OF ASSORTED FLAVORS."
430 PRINT "THE Q AND Z KEYS CO
NTROL THE UP AND DOWN POSITION O
F THE LOLLI- POP. YOU MAY ALSO
USE A JOY  STICK PLUGGED INTO
THE PORT ON  YOUR LEFT."
440 PRINT "YOU GET CREDIT FOR
EACH FLAVOR  YOU TRY, BUT THE SC
ORE DEPENDS  UPON THE FLAVOR ITS
ELF."
450 PRINT "PRESS "; FLASH 1;"
ENTER "; FLASH 0;" TO CONTINUE."
460 INPUT z$: CLS
470 GO SUB 300
480 PRINT AT 2,0;"THE HIGHEST S
CORING IS LICORICE  AND THEY ARE
IN THIS ORDER."
490 PRINT AT 5,9;"LICORICE...49
";TAB 9;"GRAPE......36";TAB 9;"C
HERRY.....25";TAB 9;"STRAWBERRY.
16";TAB 9;"LIME........9";TAB 9;
"PISTACHIO...4";TAB 9;"LEMON....
...1"
```

18

```
┌─────────────────────┐
│ ┌─────────────────┐ │
│ │▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓│ │   ## AERCO              by
│ │   FD-68         │ │   USERS            Dennis
│ │ DISC INTERFACE  │ │   COLUMN           Jurries
│ │▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓│ │
│ └─────────────────┘ │
└─────────────────────┘
```
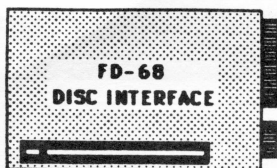
AERCO USERS COLUMN

by Dennis Jurries

There has been no EPROM updates in the last two months, so I will give the conversion changes for TASWORD II, and PRO/FILE. In the next issue I will give a conversion command table comparing the commands for the AERCO, RAMEX, and the ZEBRA disc systems.

The following are the changes you can make to convert TASWORD to the AERCO disc system. These changes do not include any wording changes that you may want to make, to have Tasword refer to disc rather than tape.

```
Line -  15:5 CAT "tasword.BIN",
       700:4 MOVE "tasword.BAS",15
       710   MOVE "tasword.BIN",54784,10751
      1030:3 LET A$=A$+".BIN"","+ STR$ b+","+ STR$ a:MOVE"A$"
      2030:2 LET A$=A$+".BIN"",": CAT "A$",
```

After trying for two weeks to convert PRO/FILE 2068 so that the files may be saved separately from the program...I gave up. I tried to use both an early and a later version of the program. This is an excellent data base program, and really needs to have one more rewrite to be fully useful. It may be possible to save the files by re-saving the complete program every time you add to or start a new file. But you would have to be extremely careful to keep separate discs for different files.

One further bit of information. Be extremely careful about formating discs with a program in the computer, and also using the erase option. This can cause the disc to crash and the loss of all information on that disc.

GAMESMATE FIX
by Steve Wyatt

Those who have purchased the GAMESMATE Kempston compatable joystick interface may have noticed conflicts with other add-ons such as the AERCO disk interface. This is due to the minimal decoding techniques used by so many of the third party peripherals, including the GAMESMATE, for the Spectrum and 2068. Further decoding can be accomplished relatively simply and without additional parts, that will resolve most of these conflicts. Understanding the circuit isn't necessary, so if you wish, refer to FIGURE 1 and make the changes.

Essentially, two more address lines, A6 and A7, are being brought into play. Originally, if I/Oreq was low(active) and A5 was low(inactive), the joystick would be enabled. Thus the GAMESMATE I/F would be active every time an I/O operation was performed and A5 wasn't used. By bringing A6 and A7 into play, we can effectively restrict the joystick to an I/O address of 31 decimal/1F hex and below. The first move is to cut the trace (marked with the X) running from pin 6 of the LS32 to pin 1 of the LS244. A6 and A7, marked A and B at the finger connectors, are jumpered to pins 1 and 2 of the LS32, and the output is then respectively taken from pin 3 and jumpered to pin 10 of the same chip. Pin 6 is jumpered to pin 9, again, on the same chip.

Finally we can take our new enable signal to the LS244 by jumpering pin 8 of the LS32 to pin 1 of the LS244.

This fix doesn't work on the Zebra Graphics Tablet, which is mapped in at 0-16. Your questions and problems can be directed to Steve Wyatt (301) 779-7743. I would like to know if this fix works with the A & J Mikrodrives.
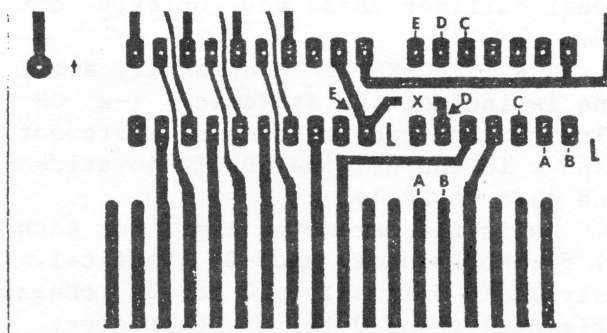
Figure 1 - Place the GAMESMATE solderside up (the chips and connector toward the table) with the connector fingers toward you, and compare the lower right portion of the board with figure 1. Cut the trace marked with an X in the diagram, and make the five jumpers using thin wirewrap wire connecting A to A, B to B, C to C, D to D and E to E. Clean the residue from the board with nail polish remover, check your connections and you're done. You can use epoxy or glue to make sure the jumper wires remain flush on the board.

JOYSTICK WRAP AROUND

by Martin DeBoniface
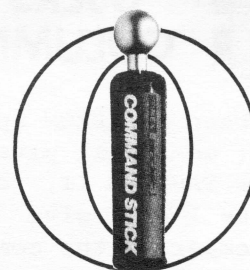
The following BASIC joystick program for the T/S 2068 computer is an enhancement to an original by Warren Fricke, first published in TIME DESIGNS Sept/Oct 1985 (Vol.1, No.6).

Keeping the flavor of it's predecessor, this program does no more than demonstrate it's new potential. Possible applications will be dealt with later.

There are two lines of code which make this program tick. All else is superfluous. These two lines are the assignment statements for "column" c and "line" l (Stmt #360 and 370).

These two assignment statements effectively replace over three dozen IF statements. It reminds me of APL, where the epitomy of programming code is; "See if you can cram it all in one line". This architectural marvel is made possible by what is known as "BOOLEAN LOGIC AND RELATIONAL OPERATORS".

Boolean Logic, also known as Boolean Arithmetic, is named after George Boole, a 19th century English mathematician and logician. Relational operators are also known as Binary operators. The T/S 2068 user's manual outlines these very briefly on page 228.

HOW IT WORKS: In a nutshell, all I have done is include the statement (-x OR ...) twice, within each assignment statement for l and c in the original BASIC joystick routine (see TABLE 1).

-x is the parameter limit for each axis -31 for horizontal, and -21 vertical. Sinclair BASIC only allows 0 to 31 characters horizontally and 0 to 21 characters vertically.

The inclusion of this bit of code, as in the antecedant program, not only checks for range limitations (eg. < 0), but acts on them as well. Should the joystick direct the cursor beyond the screen range, the limit is reassigned to it's opposite value.

What does this mean? If you try to go beyond column zero, the cursor is reassigned to the opposite side of the screen and pops up in column 31. Or, if you pass through the right side of the screen, the cursor "wraps around" the sceen and appears on the left. The same with top and bottom. That is why its called a WRAP AROUND screen.

What can you do with this you ask? The possibilities are endless. Everything from mouse controlled icons, to word processing aids (not the disease), to games, games and more games.

I have deliberately excluded any form of PAUSE statements, mainly because the faster the better. After all, you can only go so fast in BASIC. Finally, if you can appreciate BASIC, with all it's limitations, then enjoy the following: All-purpose Symbolic Instructional Code.

```
300 REM  Joy STICK WrapAr 1.0 K
         © Martin DeBoniface 30/09/85
310 LET c=10: LET l=10
320 PRINT AT l,c;"ł"
330 LET cc=c: LET ll=l
340 LET s= STICK (1,2)
350 LET b= STICK (2,2)
360 LET c=c+((-31 OR c<31) AND
    (s=8 OR s=9 OR s=10))-((-31
    OR c>0) AND (s=4 OR s=5 OR
    s=6))
370 LET l=l+((-21 OR l<21) AND
    (s=2 OR s=6 OR s=10))-((-21
    OR l>0) AND (s=1 OR s=5 OR
    s=9))
380 PRINT AT 9,9;"FIRE" AND b=1
390 PRINT AT ll,cc;" "
    AND (ll<>l OR cc<>c)
400 GO TO 320
410 SAVE "Joy STICK WrapAr":
    PRINT #0;AT 0,5;"Rewind ";
    "Tape TO VERIFY ": VERIFY ""
420 STOP
430 REM
```

INDEX

Meaningful Variable Names

c	= column	(0 - 31)
l	= line	(0 - 21)
cc	= concurrent c value	
ll	= last l value	
s	= stick value	
b	= button value	(FIRE)

```
440 REM
```

TABLE 1

```
LET c=c+((-31 OR c<31) AND
(s=8 OR s=9 OR s=10))-((-31
OR c>0) AND (s=4 OR s=5 OR
s=6))

LET l=l+((-21 OR l<21) AND
(s=2 OR s=6 OR s=10))-((-21
OR l>0) AND (s=1 OR s=5 OR
s=9))
```

LABELMAKER
by Bill Ferrebee
MOUNTAINEER SOFTWARE

I have been one of those "Sinclair Junkies" since almost the beginning. Yes... I took the abuse..."You have one of those toys?!?"..."I thought that was a high-tech doorstop!"...and so on. But, you know as well as I do that you wouldn't trade in your T/S for anything. Our motley crew of tinkerers constantly come up with new and exciting ways to enjoy or "toys". And with great publications such as this, we never run out of places to share our newfound knowledge, or gain insight on how to even beter use "the power within our reach".

With this in mind, I would like to give a gift to you, "the believers". Label-Maker is a short program that I wrote to fulfill a need I had for a way to make nice looking cassette labels for my software collection. LabelMaker will work with any full-size printer interface you may have (AERCO, Tasman, A&J, Oliger) because you will use the print driver software provided with your interface, to drive this program.

First, load the driver software for your interface, and save it to a blank tape. DO NOT REWIND THE TAPE! Next, type in the simple program below. SAVE this on the tape immediately following the driver. Make sure to use the LINE command on the SAVE so that it will auto-run.

That's all there is to it! Just one note...If you plan on using double quotes ("), such as LOAD "", you will need to input TWICE the amount you will want printed. LOAD "" will need to be inputted as LOAD """".

I have found a great place to buy form feed cassette labels to use with your full-size printer. CUSTOM TAPE LOADERS (8135 Cox's Dr., Suite 209 Portage, MI 49081) has them available in four colors (white-blue-red-yellow) for $1.60 per 1000. Check out their prices on blank computer tapes, too.

I hope you get as much out of this program as I did. Let me know if you make any modifications to this program. Bill Ferrebee, MOUNTAINEER SOFTWARE, 749 Hill Street #6, Parkersburg, WV 26104.

```
This program runs on the T/S 2068
 10 CLS : INPUT "Program Title:";a$
 12 IF LEN a$>32 THEN  GO TO 10
 14 PRINT TAB 16-(LEN a$/2);a$
 20 INPUT "Line #2 Info:";b$
 22 IF LEN b$>32 THEN  GO TO 20
 24 PRINT TAB 16-(LEN b$/2);b$
 30 INPUT "Line #3 Info:";c$
 32 IF LEN c$>32 THEN  GO TO 30
 34 PRINT TAB 16-(LEN c$/2);c$
 38 PRINT : PRINT : PRINT : PRINT : PRINT
 40 INPUT "Bottom Line:";d$
 42 IF LEN d$>32 THEN  GO TO 40
 44 PRINT TAB 16-(LEN d$/2);d$
 50 PRINT AT 21,8; FLASH 1;"Correct? (y/n)"
 52 IF INKEY$="" THEN  GO TO 52
 54 IF INKEY$="n" THEN  GO TO 10
100 PRINT AT 21,8;"                ": INPUT "Number of copies :";x
110 FOR i=1 TO x
120 LPRINT TAB 16-(LEN a$/2);a$
122 LPRINT TAB 16-(LEN b$/2);b$
124 LPRINT TAB 16-(LEN c$/2);c$
126 LPRINT : LPRINT : LPRINT : LPRINT : LPRINT
128 LPRINT TAB 16-(LEN d$/2);d$
130 LPRINT : LPRINT
132 NEXT i
140 INPUT "More? (y/n):";x$
142 IF x$="y" THEN  GO TO 100
150 INPUT "Another title? (y/n):";x$
152 IF x$="y" THEN  GO TO 10
160 CLS : PRINT AT 10,8;"[Work  Complete]": STOP
```

THE PORTUGUESE CONNECTION
by John W. Gaddis

Hi and welcome to the first of what I hope to be many columns in TIME DESIGNS on the 3 inch Floppy Disk Drive System from Portugal, that is being sold by Zebra Systems. I hope that the Holidays were good to you. Maybe some of you received the Zebra Disk Drive System for a Christmas gift, and are looking into tapping the full power of this system. It will be my goal to help you use this system to its full capacity.

As the next few months go by, we will be going over how to use the "Tree Structure" operating system of the drives, to develop many directories and related files on one disk. We will also be going into depth on the two file systems supported by these drives...random access and sequential files.

21

Its the first of these file systems, or Random Access files, that is the most exciting. By using random access files, we are now in the position of using our drive system as a "disk RAM". That means that because of the speed that the drives work at, we can use the disks to store information and send specific information to our programs randomly. Large data files, such as a phone book program, will just access the information you need, and not the entire data file.

File storage is what sets this system apart from the cassette recorder. Now I know what you are saying. Its the speed that sets this system apart from cassettes. Well, that is only half true. It breaks my heart to see people spend the $350 bucks for a state of the art disk drive system, and use it for just saving and loading programs. No, it is the way that we can manipulate our data files, and not have their size be limited by the computer's memory, that sets this system apart from the cassette recorder.

Whew, sorry about that soap box stuff. I just get that way when I think about how powerful this system is.

Other articles will include using the RS232C ports with a Hayes 1200 modem (I do it now), as well as hooking up a serial printer to them. We will also look at existing programs for the T/S 2068, and how we can convert them for use on the D.D. system.

On that vein, there was one program that I used more than any other, and that was TASWORD TWO. One of the first things I did was to convert it for use with the D.D. system. Lets see how this is done.
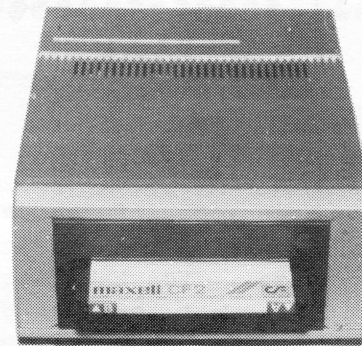
The first thing you must do is to exit the program and get into BASIC. Go to line 15, and change the part about LOAD "tascode.cod" to LOAD* "tascode.cod". Next, go to line 700 and 710 and put an * in front of the SAVE commands. After that is done, go to line 1030 and do the same for that SAVE command. Just one more line to go...line 2030. There you put an * in front of the LOAD command. Type in GOTO 700, and there you have it, TASWORD TWO on the Zebra Floppy Drive System.

Now while that is a bare bones change, in the October issue of L.I.S.T.ing (the user groups newsletter from Long Island, New York) my best friend Andy Gippetti did an in-depth conversion of Tasword, that makes it even more powerful. Andy's conversion allows for files from both cassette and disk to be used, and gives you a CATALOG option in the main menu. For a copy of this article or any other statements you may have, feel free to write me at: 21 Regina Dr., Sayville New York 11782. You can also join L.I.S.T., or a more local users group that gets the LIST newsletter. Well, bye for now!
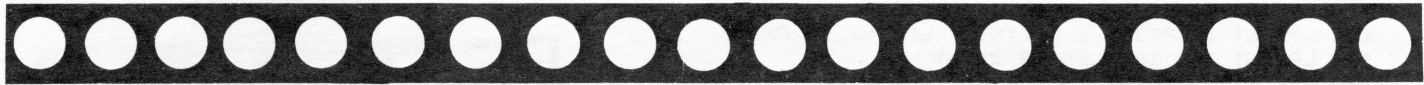
MACHINE CODE TUTOR
Reviewed by Duncan Teague

The Complete Machine Code Tutor
Knighted Computers
707 Highland Avenue
Fulton, NY 12069
T/S 2068; $18.50

Upon opening the black case containing the two cassettes, I recalled a painting that decorates Walker Hall at M.I.T. The painting depicts the Serpent tempting Adam and Eve with the fruit of the Tree of Knowledge. It's Latin inscription says, "you shall be even as the gods, knowing good and evil."

This "apple" from Knighted Computers tempts with insights into and an understanding of the language of machine code programmers, who, as we all know, speak directly to the great god, Z80. In this brief article, I'll tell you first how MCT operates and then how well it performs its intended purpose.

MCT teaches the "instructions" used to communicate with the Z80 microprocessor in the same way a BASIC tutorial teaches the "commands" used in that language. Three techniques are used. The actions performed by the instructions are explained in text.

Examples of the instructions in use are shown by means of a "simulator". The student is allowed to practice using instructions by modifying the examples.

The simulator is loaded first. Experienced pupils can begin practicing using instructions already learned. Alternately one of the sets of lessons can be loaded into the simulator. The lessons are divided into four groups:

01-09 Introduction to Registers and Memory; Loading, Comparing, Incrementing, Decrementing

10-17 Decision Making: Jumps, Calls, and Stack Operations; Binary, Decimal, and Hexadecimal Notation

18-25 Bit Manipulations: Shifting and Rotating; Flags: Sign and Parity

26-35 Specialized Registers: Index and Alternates; Input/Output and Block Instructions; Interrupts

In each set you advance through a menu/list by pressing the SPACE bar. The ENTER key choses a "lesson" on a particular instruction or a corresponding "example" demonstrating the use of that particular instruction. During the lesson or example, a BREAK will return you to the menu/list.

The demonstrations run by means of the simulator. A single keystroke by the user runs the demonstration or moves it ahead one step. With each step the current status of every register, memory location, and flag is shown. The user is challenged to understand and eventually learn to predict what will happen.
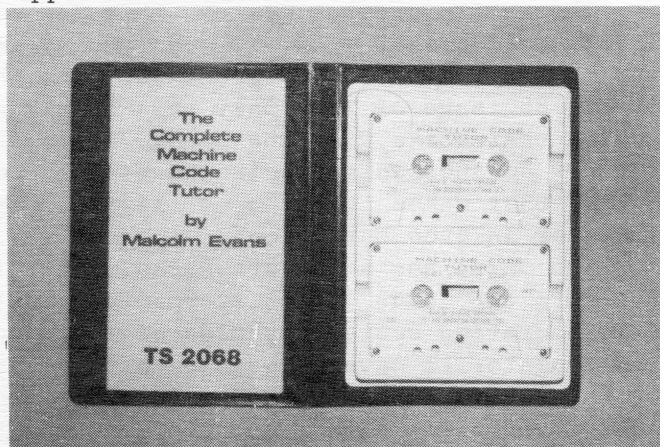
Once the lesson is sufficiently understood in concept and in practice, you may elect to "edit" the demonstration routine. A user friendly editor makes it easy to experiment by altering either the numerical values used or the instructions themselves.

Internal error messages alert you to invalid instructions or operations which would overwrite the MCT program itself. The user is reminded if a RETurn is not included at the end of the routine. In short the user's routine is not allowed to crash. If the instructions are valid, then they are "assembled".

The assembled instructions can then be run by the simulator one step at a time just as the demonstrations are. This provides the pupil with immediate feedback on how well the concept taught has been understood or mastered.

One of the safe areas with which the user is allowed to experiment is the screen display. The demonstrations often change the attributes of screen locations, so a color display is very helpful, although not essential.

The same 42 character per line "microprint" used in the Masterfile database program is employed throughout MCT. This allows one-third more text to be displayed on each screen line than the 32 character mode can provide. Despite the smaller letters, the text is clear and easy to read.

The tutorials on the various Z80 instructions make more sense the more times you are exposed to them. They also do a better job of explaining machine code programming than any other book or magazine article I've read. The reason for this is the "explain-predict-control" format of each lesson.

After a cursory look at all 35 lessons, I am still not a machine code programmer. Although I'm not ready to write a whole program in Z80 mnemonics, I was actually able to produce my own short routines to manipulate screen attributes and to move blocks of text around at machine code speed.

The MCT is not the ultimate machine code programming tool, nor is it intended to be. A serious student will eventually have to acquire a good machine code assembler to translate newly learned instructions into the 1's and 0's understood by the computer.

I seriously doubt that anyone has developed an assembler as user friendly (uncrashable) as MCT. An explorer in this new realm will, however, be able to practice routines with the MCT simulator before entering them into a working assembler. Don't expect miracles with The Complete Machine Code Tutor. But a better set of training wheels probably cannot be obtained.
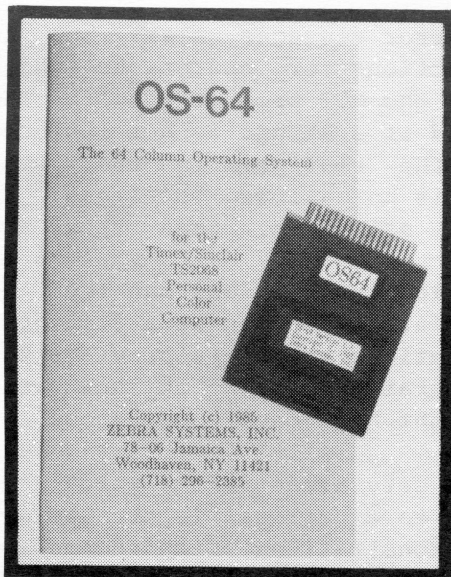
OS-64
Reviewed
by
Tim Woods

One way of looking at the OS-64 Cartridge Software, is an "unfulfilled promise" that has come true for the 2068. All manner of cartridge-based software was to have had a perfect marriage with this computer, such as languages, CP/M, ROM expansion, utilities for bank-switching, and yes, utilities for the extended video modes. The 64 column text mode is one of these modes, that up until now, has barely been utilized (on a wide-scale basis).

The OS-64 Cartridge is a small pc board with an EPROM, a decoder IC, and covered with a thin plastic housing that is spray-painted black. It is somewhat larger than an original Timex cartridge, and has a rather snug fit when inserted into the cartridge dock of the 2068.

The accompanying manual is 12 pages long, and outlines the basic functions of the OS-64. While the language is clear and straight-forward, I have the feeling that some users will want to receive additional information not covered in the manual. Such as an in-depth explanation of how this new system "works", along with system ROM calls, and more details on printer/interface operations.

There are a few limitations that should be pointed our to prospective purchasers of the OS-64. First, it doesn't support the printing routines of the Timex 2040 printer. Instead, it has built-in print drivers for the AERCO, Tasman, A&J, and Oliger printer interfaces. The system defaults to the AERCO (but a simple POKE will select the correct one). The trade off for the 2040 is the full size printer facilities.

OS-64 doesn't use the command FLASH. PAPER and INK have limited effect, and are pre-determined. All graphics commands work normally (255x175), however, the 512 pixel-width mode is accessible by machine code. All other BASIC commands are normal, only now PRINT, LIST, LPRINT, LLIST, ect., are in 64 columns.

When the 2068 powers up, it re-initializes, and the OS-64 takes over. A quite noticeable white characters on black background screen appears. There is no border, as all of the screen is now used. I have only used the OS-64 with a color composite monitor, and the small character definition is fairly readable. The user manual strongly recommends the use of a monochrome or RGB monitor. This would reduce eye-strain over a period of time.

One of the impressive "effects" of this system, is LISTing a BASIC program...no more "wrap-around" of program lines, all information for a line number is on one 64 col. line. This allows for easy editing and debugging of programs.

The other important aspect of the OS-64 would be in software development especially for this operating system. I have had the opportunity to preview two such programs.

The first program is called PERSONAL SECRETARY. Unlike other common appointment managers, you can now see a whole screen full of appointments, along with a calender of the month you are working with. Very nice touch. My copy of Personal Secretary was previewed on the Zebra Systems Disk Drive system. Together with the floppy drives, and the OS-64...it was a SUPER operating system!

The latter program, is one that you may already be familiar with, if you read my review of the VIEWORD word processor in the NOV/DEC 85 issue of TDM. Only this is a new version that works with the OS-64. There are many new enhancements (including 64 col. of course) that makes this good little word processor an even better one.

The OS-64 has a few drawbacks, but it does turn the 2068 into a "professional" style operating system. Outside of the Spectrum Emulator, I haven't seen a better use for the 2068's cartridge dock. Put into the right developer's hands, some very interesting and practical software could be written.

OS-64 is available from Zebra Systems, Inc., 78-06 Jamaica Ave, Woodhaven NY 11421) for $29.95 plus $3 for total order P&H. PERSONAL SECRETARY software is also available from Zebra on cassette or 3 inch disk. VIEWORD is available from Jim Clatfelter, 3361 Sand Ridge Road, Placerville CA 95667.
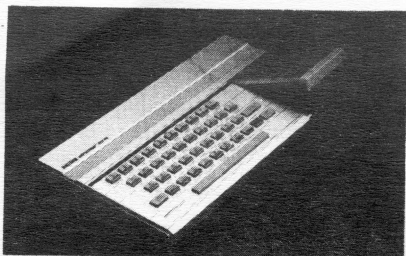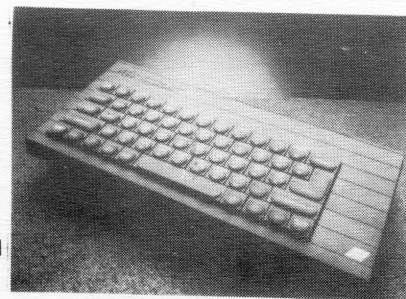
RAINBOW PLUS
Reviewed by Duncan Teague
The Rainbow Plus Spectrum Interface
Damco Enterprises
67 Bradley Ct.
Fall River, MA 02720
T/S 2068; $49.95

You can count the numer of ways to run Spectrum software on one hand. If you don't want to to to the expense of purchasing a Spectrum Computer, then there are only four:

1. Replace your T/S 2068 ROM with a Spectrum ROM.
2. Use both ROMs, selecting between with a switch.
3. Use an "emulator" that plugs into the cartridge port.
4. Use an "emulator" that plugs into the expansion port.

The first two choices require opening the computer, voiding its (ha!) warranty. Many of us just won't chance messing up our computer through accident or ineptitud. But we're not averse to plugging in something. We've had experience with that technique.

The last two choices involve tying up either the cartridge port or the expansion port. This prevents its use by other peripherals. The choice of which port to use for Spectrum emulation is a matter of what else you want to accomplish.

The Rainbow Plus Interface is a small black box which plugs into the 2068 expansion port. A switch on the left rear changes its operating mode from T/S 2068 to Spectrum. Instructions advise powering off the computer before installing the interface.

The Rainbow Plus Interface allows the access to the whole line of Spectrum software, but that's not all it does. Its operating system is on an eprom. This makes possible the correction of some flaws in the Spectrum ROM. The Rainbow Plus also has a Spectrum compatible edge connector. This renders the entire line of Spectrum hardware peripherals available as well.

When you turn on the computer with the interface in Spectrum mode, your computer first initializes in T/S 2068 mode. Then it re-initializes in Spectrum mode. Instead of the normal copyright notice, you see "Sinclair Spectrum Mod. B."

This modification refers to the fact that several known bugs in the Spectrum ROM have been fixed. One unexpected feature is the inclusion of 21 user-defined graphics symbols. They include the superscripts 0-9, six letters from the Greek alphabet, and five other symbols of marginal utility.

In this mode you can load Spectrum software. All 24 of the programs I tried, loaded with no difficulty. I had a nice suprise with the PAINTBOX graphics utility and drawing program. Paintbox has 84 udg's that are available. Along with the 21 already contained in the Rainbow Plus eprom, my version of Paintbox now has 105 udg's that can be edited, used, and saved to tape.

I also had the opportunity of testing a couple of Spectrum peripherals with the interface. The DK'Tronics Light Pen and the DK'Tronics Sound Synthesizer worked equally well. I will report in detail on these peripherals in subsequent reviews.

While the Spectrum compatible hardware works fine, it should be noted that T/S 2068 hardware does NOT work when attached to the rear of the Rainbow Plus. A TS 2068 printer interface, for example, must be attached first to the computer. Then the Rainbow Plus can be piggy-backed onto the TS 2068 hardware.

Two exceptions to 2068 hardware incompatability with the Rainbow Plus interface should be noted. The 2040 thermal printer and the 2050 modem CAN be used behind the Rainbow Plus.

I find the Rainbow Plus Interface, extraordinarily easy to use. Installation on the expansion port is easier than opening up the computer. In operation it's more reliable than some other devices. By this I mean that the Spectrum mode initializes 100% of the time. This is not so with the ROM switching technique.

The use of the expansion port is a problem for me. My parallel printer interface doesn't have a rear edge connector of

its own. I can't plug it in first and then attach the Rainbow Plus. But that's a problem with my printer interface, not with the Rainbow Plus.

The eprom operating system with the corrected bugs and stored udg's is superior to other devices which employ a standard Spectrum ROM. Its software compatibility and firmware features, coupled with support of Spectrum hardwar devices, make the Rainbow Plus Spectrum Interface the optimum choice among several possibilities for Spectrum emulation.

ASTRONOMER

Reviewed by Paul Bingham

        Program: ASTRONOMER
           Type: Educational/Technical
        Machine: Spectrum or 2068 with Spectrum ROM
         Length: 48K
          Price: $14.95
     Written in: Machine Code
       Listable: no
   Manufacturer: CP Software
         Author: Paul Marshall

As an avid fan of astronomy, I have kept my eyes open for a 2068 program that could aid my star gazing interests. Eric Burgess' book More Uses for Your TS 1000: Astronomy on Your Computer was all I had found until now. Another book of his, Celestial Basic, has been useful. It is similar to the other but examples are for the Apple IIc.

ASTRONOMER by CP Software of England is an impressive package. It comes in a colorful box along with a professional sixteen page typeset instruction booklet. This is well written and though brief, adequate.

Using Doug Dewey's OMNI-EMU ROM board, ASTRONOMER loaded and ran without a hitch. I did load side two, which is just another copy. It loaded but appeared to fail completing its setting of bits in the UDG area before self-running. It later crashed.

The program takes 4 min. 40 sec. to load. Colorful graphics make the wait bearable. The opening menu lists six options. Option No.1 allows the user to enter the exact latitude and longitude, the time (to seconds), and the date for anywhere on the earth. This program throughout is very, very accurate. Options 2 and 3 give the user coordinates for his date and time of the planets, sun, moon, four of the largest asteroids, comet Encke, and yes, Halley's comet, too. This and most information is easily printed out on the 2040 thermal printer. Options 2 and 3 allow the user to ask for the coordinates over a range of times and dates as well. Since most of the information is useful only to telescope owners, it may be less important than the other options.

Option 4 is the most complex. Here the computer calculates and stores the position of 1090 stars (to magnitue 4.75) which are visible under normal conditions to the human eye. This is more stars than is shown on my Planisphere! It divided the night sky into five parts, treating the sky as a huge dome. The top is circular when cut out--this is part five. The rest is divided up equally into north, east, west, and south panels-- parts one through four. These views can be chosen and within 25 second (2 min. for the circular part five) all the stars to magnitude 4.75 are plotted out. Faint stars are single pixel points, brighter stars more. The display is colorful and impressive. By entering any of the 79 constellation codes ASTRONOMER will trace out each (see fig. A). By re-entering the same code, it erases the lines it drew in. This is remarkable! There is even a code ALL which traces out all of the constellations. This takes nearly ten minutes.

Option 4 requires a calculation time of 10 min. 48 sec. the first time through. Once completed, the user can skip from option to option and to any view in option 4 without needing to recalculate anything. Only if the user changes the date, time or location using option 1 will option 4 require this period of re-calculation. The computer beeps loudly when done, in case the user has left the room.

Option 5 is in a way a close-up or zoom of the views in option 4. Option 5 splits the sky into 362 overlapping charts of 20° Declination and 2 hour Right Ascension...... telescope coordinate values. As in option 4, option 5 will allow tracing of constella-

its own. I can't plug it in first and then attach the Rainbow Plus. But that's a problem with my printer interface, not with the Rainbow Plus.

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tions. Fig. B (Lupus the Wolf) and Fig. A are given for comparison.

In both options 4 and 5, the location of all the objects available from options 2 and 3 (i.e. the planets, comets, ect.) can be superimposed among the constellations by using their three-letter codes. The position is shown as a tiny plus sign which blinks three times then remains. Entering the code again works in reverse and removes it. I found some star regions so busy with stars so as to miss the blinking plus sign the first time. Fig. C and D show all of the planets lined up with the setting sun on March 10, 1882. This answers a query put forth by Duncan Teague in the Jan/Feb '85 issue of SYNCWARE NEWS for which a prize was to be awarded. (Does this mean I win?)

Option 6 lets the user find the rising and setting times of the solar system objects or to see an animated view of the solar system itself (see Fig. E). The user inputs the starting date and interval. The motion of the planets continues until the user stops it. This animated view I have found to be very educational and easily understandable by my small children.

ASTRONOMER is a very thorough and complete program. It can grow with the observer as the observer's needs grow. It is also worthwhile to those following Halleys Comet or as an educational device.

Is ASTRONOMER perfect? No, it has a few drawbacks. In option 4 or 5 the user may be annoyed by a "POSITION NOT CALCULATED" ..... message accompanied by a loud beep when entering the code for a solar system objec. As it turns out, the position of each object to display in option 4 or 5 must first be called up in its menu in option 2 or 3. This is a four-key procedure for each object.

This boils down to TIME. The user must figure on 4:40 to load the program initially 4:30 to run through the four-key procedure for all the objects, 3:00 to change the date, time and location (which comes set for London, 1/1/84), and 10:48 for the initial sky calculations in option 4. The grand total is 23 minutes or so to get ready.

If I could make all the changes in 23 minutes and then SAVE the program it would be fantastic. Even a back-up copy would be nice to have. However, being a self-running machine code program, no provision for such is included. I have tackled ASTRONOMER using 007 SPY and have managed to make a back-up copy after several nights and lots of head-scratching. This is however only a copy as it comes from England. Maybe with HOT Z II I

could wade through the 46K of data and find the bytes I need to alter...or maybe not.

At any rate, ASTRONOMER is an excellent aid to most any level of interest in astronomy. It works well, is professional, and at $14.95 is an exceptional value. Similar programs for the PC start at $65. My OMNI-EMU and ASTRONOMER together were less money. It is a good way to get ready for Halley's Comet and much more. It rolls into one at least eleven of the 20 programs in Burgess' book. The printouts do not do the real graphics justice--see the program for yourself.

ASTRONOMER is available from: Curry Computer, 5344 W. Banff, Glendale AZ 85306, for $14.95 plus 90¢ shipping.

HALLEY'S COMET

At 3h 30m 0s GMT on 26-6-1985

Position is   RA 5h 29m 33s
                    Dec +18° 5' 34"

Distance is 4.14 AU

Figure A

Figure B

Figure C

Altitude of 50° & above.

Figure D

Figure E

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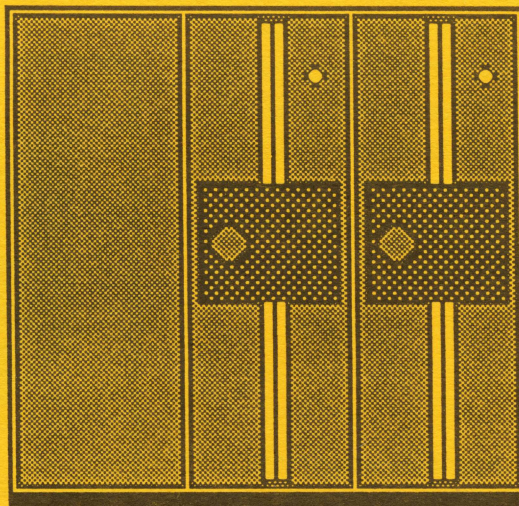
FD-68 INTERFACE

Controls 1-4 drives

3 inch to 8 inch drives
Shugart compatible

Single or double sided

40/80 tracks per side

64K RAM (256K opt.)
& 8K ROM on board

RGB monitor output

SYSTEM COMPONENTS

$199 FD-68 Interface

$99 Drive 40T/DS/DD
5 inch/400 kilobyte

$99 Dual Drive Cabinet
and 5 amp Pwr Pack

$3 Per Item S&H

Texas Residents add 6%

VISA/MasterCard add 5%

Enhance the performance of your TS 2068 with the **AERCO** Disc System. All of the speed and convenience of a full-out floppy disc system. Save, load and copy programs at the industry standard of 250,000 bits/sec. Fully compatible with all Shugart type drives, including those already in use with the **AERCO** 1000 Disc System. The 64K of on-board RAM can be used as a second bank of system memory or for a full-blown CP/M System (version 2.2). The RGB output is crystal clear and rock steady. The power supply is a 5-amp high efficiency switcher. We offer a variety of other hardware for all models of sinclair-TIMEX.

NOW AVAILABLE: 256K UPGRADE $50 (2-drive max) $80 (4-drive max)

	TS/2068	TS/1000-1500
Floppy Disc Interface	$199	$179
Disc Drives	from 79	from 79
Power Supplies	99	99
Centronics Printer I/O	69	99
Dual RS-232C Serial I/O	99	99
C ITOH 8510 Printer	375	375
C ITOH 7500 Printer	275	275
ROM Bd. with Auto Disc Boot	n/a	59
RGB Cable (specify monitor)	30	n/a
CP/M (V. 2.2)	25	n/a

AERCO
ACME ELECTRIC ROBOT CO

Box 18093 Austin TX 78760
Ph (512) 451-5874